Smithsonian

ULY 2000

The Making of *The Patriot*

Mel Gibson leads a militia charge [PAGE 44]

Goes from zero to fun
in two shakes of a rabbit's tail.

Introducing the Chevy™ Venture® Warner Bros. Edition*, a minivan that took a le
turn at Albuquerque and found its way into the hearts of parents everywhere. Only Chev
and Warner Bros. could design this kind of fun. With its amazing three-way audio control
flip-down monitor and built-in video player, you can entertain a small army of kids for mile
And to keep the good times rolling, there's VentureTainment!,℠ a unique ownership packag

*Limited availability. Call 1-877-4FUN-VAN for ordering information. †See dealer for details regarding integral child safety seat usage. **Child Passengers at Risk in America Stud

To find out more, call 1-877-4FUN-VAN or visit us at chevrolet.com.

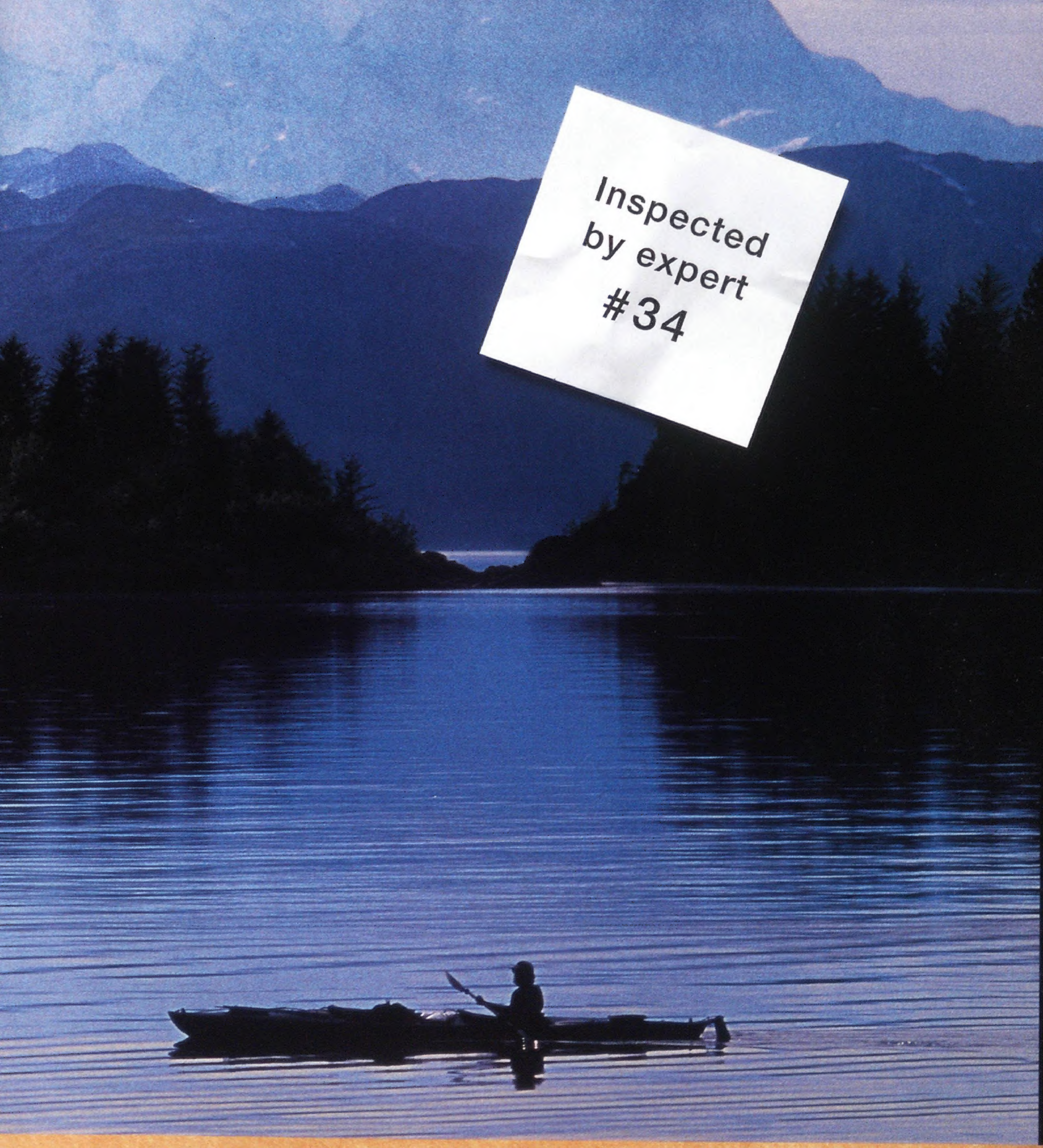
of ongoing benefits from Chevrolet® and Warner Bros. This Venture also comes with a standard integral child safety seat†, so you won't have to struggle with installing one. (According to the National SAFE KIDS Campaign, child safety seats are misused 85 percent of the time**.) Plus flip-and-fold modular bucket seats. All this fun, and more, is standard in the Warner Bros. Edition. After all, it's a Chevy Venture, the most versatile minivan ever.

CHEVY VENTURE

WE'LL BE THERE™

National SAFE KIDS Campaign, Feb. 1999. ©2000 GM Corp. Buckle up, America! LOONEY TUNES, characters, names and all related indicia are trademarks of Warner Bros. ©2000.

Glacier Bay, Alaska. August. Visited by Drew Lapp, adventure expert #34 for iExplore. If you've got a travel dream, chances are we've lived it. Call us or come to our full-service website and our experts will help you plan your trip, book it, and find the gear you need. To get off the beaten path, this is where you start.



iExplore

Come back different

www.iexplore.com (800) i-explore

SMITHSONIAN

features

JULY 2000 ♜ VOLUME 31, NUMBER 4

32 Battling the Orange Monster
With axes, bulldozers—and air power—wildland firefighters in Northern California wage all-out war against blazes
BY EDWIN KIESTER, JR. ◆ PHOTOGRAPHS BY ED KASHI

44 Capturing America's Fight for Freedom
The makers of *The Patriot*, starring Mel Gibson, consult the Smithsonian on uniforms, weapons and other period details
BY LUCINDA MOORE

56 The Poetic Vision of Spanish Sculptor Eduardo Chillida
Creating monumental works in iron, steel, wood, the celebrated artist has come to see space itself as material to mold
BY STANLEY MEISLER

64 Down on This Farm the Times They Are A-changin'
Holistic farmer Joel Salatin casts convention aside for methods that make sense to the head, heart and land
BY VIRGINIA SHEPHERD ◆ PHOTOGRAPHS BY LYNDA RICHARDSON

74 Nightjars Are Everywhere, But Just Try Finding One
Protectively camouflaged and active mainly at dusk and dawn, these birds aren't easy to see, let alone photograph
PHOTOGRAPHS AND TEXT BY WILLIAM BURT

82 Rescue and Restoration
Artistic treasures at historically black colleges get a new lease on life thanks to an ambitious conservation project

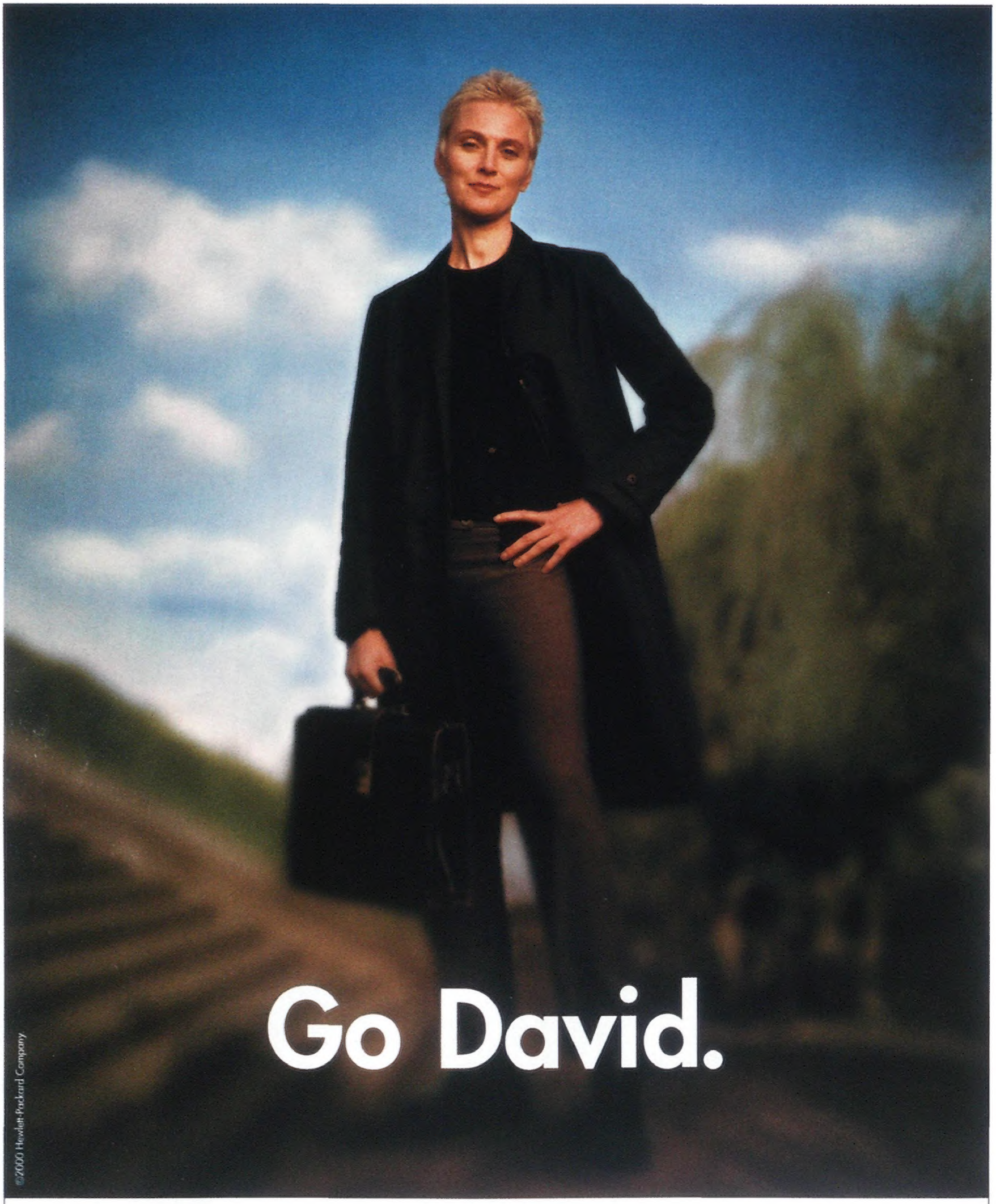
88 The Mad Hatter
Artist Moses' paper bag headpieces show the amazing things that can be done with the most basic of materials

92 Vostok: Looking for Life Beneath an Antarctic Glacier
A huge unexplored lake may hold secrets that could aid in the discovery of life elsewhere in our solar system
BY RICHARD STONE

THE BOMBAY SAPPHIRE MARTINI. AS ENGINEERED BY DAKOTA JACKSON.

POUR SOMETHING PRICELESS.

Bombay™ Sapphire® Gin. 47% alc./vol. (94 Proof). ©1999 The Bombay Spirits Company USA, Miami, FL. ©1998 Dakota Jackson.

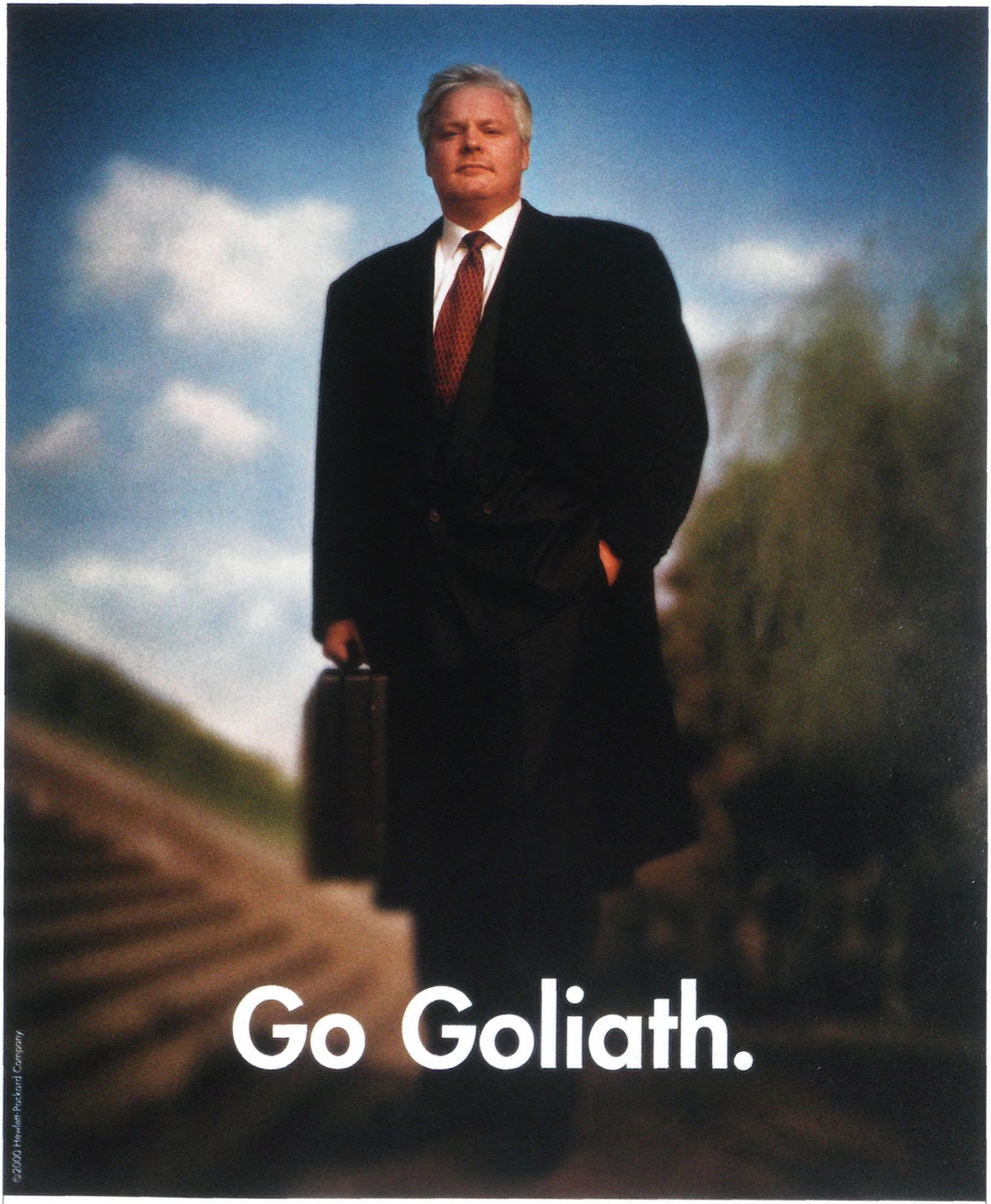


Look big. Compete globally. Run circles around your competitors with your vast enthusiasm and technical savvy. Show the world what you have to offer. Join the e-services economy. www.hp.com/david

Start-ups playing big. e-services solutions from hp.

hp

invent



Be nimble. Be quick. Run circles around your competitors with your vast experience and technical savvy. Show the world what you have to offer. Join the e-services economy. www.hp.com/goliath

Big business getting nimble. e-services solutions from hp.

hp

invent

SMITHSONIAN

departments

JULY 2000 VOLUME 31, NUMBER 4

Cover Mel Gibson, as fictional character Benjamin Martin, and fellow militiamen skirmish with British soldiers in this scene from the new Revolutionary War epic *The Patriot*. In making the film, the producers tried to be as historically accurate as possible by consulting with Smithsonian experts. There were times, however, such as in this shot, when compromises had to be made. The flag shown here would not have been used in battle but was kept in the film because of its recognizability to general audiences.
PHOTOGRAPH BY ANDREW COOPER/SMPSP/COLUMBIA PICTURES

16 Letters to the Editor

103 Additional Sources

12 A Note from the Secretary
Evidence from the Skies
BY SECRETARY LAWRENCE M. SMALL

18 Points of Interest
No Return Address
BY SUE ALLISON

22 The Object at Hand
Our Flag Was Still There
BY EDWARDS PARK

28 Smithsonian Highlights
It's a Drum
Highlights Calendar starts on page 29

104 The Last Page
Every Dog Wants to Have Its Day in Court
BY BRUCE WATSON

HOW *well* YOU SLEEP CAN HAVE

AN *even greater* EFFECT ON SOMEONE ELSE.

Your friends, coworkers, and family all depend on you. So when you get a proper night's sleep, you aren't the only one who benefits. The Sealy Posturepedic Crown Jewel® can help. Its unique Dual Support System™ both cradles and supports your body as no other bed does, so you can get the deep sleep you need. After all, it's not just for you, but for everyone who depends on you. *Sealy. We support you night and day.*

Sealy

Posturepedic

FOR MORE INFORMATION VISIT WWW.SEALY.COM OR CALL 1-800-95SEALY

45,000 maps and charts,
only a few clicks away.

MAPTECH®

The leader in digital mapping

1-800-627-7236
www.maptech.com

Galapagos

EX-PE-DI-TION (ek'spi dish'en)
n. 1a. A journey undertaken by
an organized group of people
with a definite objective.

Explore the world
with the family that
pioneered
expedition travel.

Lindblad Expeditions

FOR INFORMATION ON GALAPAGOS
AND OUR OTHER WORLDWIDE EXPEDITIONS,
SEE YOUR TRAVEL AGENT OR CALL

1-800-EXPEDITION
(800-397-3348)
WWW.EXPEDITIONS.COM

REFER TO: SM-GA050

Enduring Beauty.
Satisfying comfort.

Call to receive our free catalog:
1-877-708-1973

THOS. MOSER
CABINETMAKERS
Freeport, Maine • New York, NY • San Francisco, CA
www.thosmoser.com

Smithsonian

EDITORIAL & PUBLISHING OFFICES:
900 Jefferson Drive, SW
Rm 1301, MRC 406
Washington, D.C. 20560

INTERNET ADDRESS:
www.smithsonianmag.si.edu

SUBSCRIPTIONS:
1-800-766-2149
[outside of U.S., call 1-904-445-4662]

PUBLISHER
Ronald C. Walker
Michelle A. McMahon,
Executive Assistant

ADMINISTRATION
Valerie Martin, *Business Manager*

CIRCULATION
Scott I. Rockman, *Associate Publisher*
Carolyn Topak, *Marketing Director*
Elizabeth Hopkins, *Planning Director*
Andrea Sole, *Fulfillment Director*

PRODUCTION
E. Cherry Doyle, *Director*
Greg Williams, *Quality Manager*
David Sterling, *Editorial*
Katherine Balch, *Advertising*

ADVERTISING
David C. Cator, *Associate Publisher*
Lorraine Sakli, *Marketing Director*

NEW YORK 420 Lexington Avenue
Suite 2335, New York, NY 10170-0084
212-490-2510 ◆ fax: 212-986-4259

ATLANTA Brown & Company
770-998-2889 ◆ fax: 770-552-8250

CHICAGO Warden, Kelley, Allen & Opfer
312-575-1100 ◆ fax: 312-575-1107

DETROIT Heth & Associates Inc
248-642-7273 ◆ fax: 248-642-1311

LOS ANGELES
Charles E. Schmuck & Associates
310-478-3833 ◆ fax: 310-478-1833

SAN FRANCISCO
Charles E. Schmuck & Associates
415-986-1945 ◆ fax: 415-986-1159

TOKYO
International Communications Inc
81-33-593-1441 ◆ fax: 81-33-580-0414

MEXICO
Towmar Representaciones Profesionales
525-395-5888 ◆ fax: 525-395-4280

SMITHSONIAN BUSINESS VENTURES

Gary M. Beer
Chief Executive Officer
Jeanny Kim
Executive Assistant

BOARD OF DIRECTORS

Thomas Kenney
Chairman

Robert Fri
Ronald Ruskin
Constance B. Newman
Anthony Welters

Smithsonian

SECRETARY OF THE SMITHSONIAN INSTITUTION
Lawrence M. Small

EDITOR
Don Moser

BOARD OF EDITORS

Diane M. Bolz
Kathleen M. Burke
Jim Doherty
Alexis Doster
Marlane A. Liddell
Sally Scott Maran
Edgar Rich, *Pictures*
John F. Ross
John P. Wiley, Jr.

ASSOCIATE EDITORS

Caneel Cotton, *Pictures*
Bruce Hathaway
Marian Smith Holmes
Karen Larkins
Alison C. McLean
Lucinda Moore
Beth Py-Lieberman
Ruth Ravenel
Bonnie Stutski, *Pictures*

ASSISTANT EDITORS

Elizabeth J. Erskine
Lyn Garrity
Valerie Jablow
Rebecca Maksel
Christian Moen
Minna Morse
Angela M. Pleasants
Sadie Quarrier, *Pictures*

RESEARCH ASSISTANTS

Karla A. Henry
Carolyn McGhee

CONTRIBUTING EDITORS

Constance A. Bond
Suzanne Crawford
Timothy Foote
Edwards Park
Bennett Schiff
Nancy Seaman
Paul Trachtman

Smithsonian Institution

BOARD OF REGENTS

EX OFFICIO

Chief Justice of the United States, William H. Rehnquist, *Chancellor*
Vice President of the United States, Albert Gore, Jr.

APPOINTED BY THE PRESIDENT OF THE SENATE

Hon. Thad Cochran
Hon. Bill Frist
Hon. Daniel P. Moynihan

APPOINTED BY THE SPEAKER OF THE HOUSE

Hon. Sam Johnson
Hon. Robert T. Matsui
Hon. Ralph Regula

APPOINTED BY JOINT RESOLUTION OF CONGRESS

Hon. Howard H. Baker, Jr.
Hon. Barber B. Conable, Jr.
Ms. Anne d'Harnoncourt
Dr. Hanna H. Gray
Dr. Manuel L. Ibáñez
Dr. Homer A. Neal
Mr. Alan G. Spoon
Mr. Wesley S. Williams, Jr.

SMITHSONIAN NATIONAL BOARD

Hon. Max N. Berry, *Chair*
Hon. Marc Leland, *Vice Chair*

Mrs. Carolyn S. Blount
Mr. L.H. "Hacker" Caldwell
Mr. Richard O. Campbell
Mrs. Jean Case
Mr. Pete Claussen
Mrs. Laurel Cutler
Mr. Frank A. Daniels, Jr.
Mr. Robert Donnelley
Mr. Archie W. Dunham
Dr. Sylvia A. Earle
Mrs. Jane B. Essner
Mrs. Harriet Framboldt*
Mrs. Patricia Frost
Mr. Nely Galán
Mr. Bert Getz
Mr. Stephen Hamblett
Mr. Frederic C. Hamilton
Mr. Paul Hertelendy
Mrs. Marie L. Knowles
Ms. Elizabeth S. MacMillan
Mr. John D. Macomber
Mrs. Holly Madigan
Mr. Frank Martucci
Mr. Michael McBride
Mr. Kenneth B. Miller
Hon. Norman Y. Mineta
Mr. Charles Moore
Mrs. Susan Reed Moseley
Mr. Henry R. Muñoz III
Ms. Nancy Brown Negley
Mrs. Mary Ourisman
Mr. James Patton
Mr. S. Davis Phillips
Mr. Thomas F. Pyle, Jr.
Baron Eric de Rothschild
Mr. David M. Silfen
Mrs. Helen Spaulding
Mr. Kelso Sutton
Mr. Jackson Tai
Mr. Anthony Welters
Mr. Daniel Yohannes

HONORARY MEMBERS

Mr. Robert McC. Adams
Mr. William S. Anderson
Mr. Barbara P. Cooley
Mr. Joseph F. Dickman III
Mr. Charles O. Dunlevy, Jr.
Mr. Alfred C. Glassell, Jr.
Mr. James M. Kemper, Jr.
Mrs. Jean B. Mahoney
Hon. George C. McGhee
Justice Sandra D. O'Connor
Mr. S. Dillon Ripley
Mr. Francis C. Rooney, Jr
Mr. Wilbur L. Ross, Jr
Mr. Lloyd G. Schermer
Hon. Frank A. Weil
Mrs. Gay F. Wray

* Ex-Officio Member

FOUNDERS: S. Dillon Ripley, Edward K. Thompson

PUBLISHER EMERITUS: Joseph J. Bonsignore

See the world's greatest gathering of polar bears in Churchill, Manitoba along the shores of Hudson Bay. Travel with the recognized leader in polar bear tours.

Tundra Bunkhouse Tour **$3295**

Our NEW Polar Bunkhouse Lodge is ready for guests. Stay on the tundra among the bears, the Aurora Borealis and other tundra wildlife. Private berths, great food, and plenty of creature comforts!

Polar Buggy Tour **$1995**

3 full days on the tundra viewing bears and other wildlife from the safety of our remarkable Polar Buggies.

Departures in Oct. and Nov. 2001

Call to reserve your tour today! TravelWild EXPEDITIONS

800-368-0077
www.TravelWild.com SMSS

Quality, Comfort, Style and Value

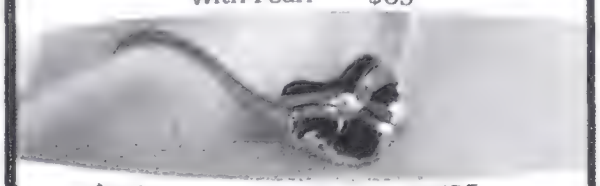
Benches • Chairs
Porch Swings • Tables
Adirondack Chairs

VERMONT OUTDOOR *Furniture*

800-588-8834
Barre, Vermont
www.vermontoutdoorfurnitur.com

Our Exclusive Design

Sterling Silver Pansy Necklace with Pearl ~ $65



Available in 18Kt Gold ~ $525

La Perla LTD
FINE JEWELERS

(800) 209-0989
www.laperlajewelers.com

Evidence from the Skies

A NOTE FROM THE SECRETARY

"BUT WHY DO YOU NEED SO MANY?"

It's a question we're asked over and over again about the Smithsonian's immense collections. Why, for instance, must we have so many specimens of mosquitoes and beetles and rocks and plants and birds and . . . ? The inventory of the Smithsonian collections could march like columns of ants down the page. What's to be gained from filling rooms and laboratories with so much evidence of nature's diversity?

But what can seem like excess may be only a reasonable degree of sufficiency. The value of many of the collections resides in their comprehensiveness. They can't be too large.

We can take a lesson from the birds. In a vast space on the top floor of the National Museum of Natural History, aisle after aisle of cases stacked almost to the ceiling hold more than 621,000 specimens of birds. The origins of the bird collection go back to the early days of the Smithsonian and to the great insight of Spencer Baird, our second Secretary, who realized that the Institution should document the biology of the world. The oldest specimens date from the early 1800s; they were already old when Baird began his work.

Carla Dove seeks answers in the bird collection.

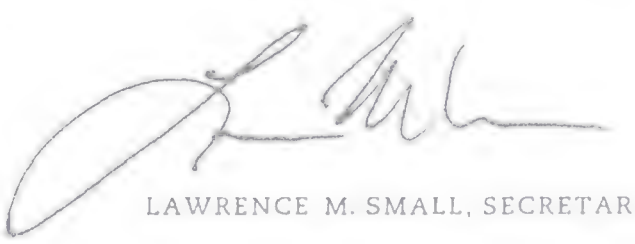
The collection, one of the world's largest, documents perhaps some 80 percent of the more than 9,000 species of living birds. As important, it documents the biological, ecological, spatial and temporal diversity within many individual species. To an untrained eye, for example, the red-tailed hawks laid in rows in a drawer will appear to be different species, and yet they are merely male and female, young and old, differing sometimes simply by the circumstance of where they lived. The collection has always been available for scientific study and research, and that painstaking work has had a remarkable, and quite unforeseen, benefit.

In October 1960, a Lockheed Electra plane taking off from Logan Airport in Boston hit a flock of starlings, and the ensuing crash killed 62 people. In November 1975, a DC-10 leaving JFK Airport in New York caught gulls in its engines. The takeoff was aborted, and though all 139 passengers and crew were evacuated safely, the plane caught fire and was destroyed. In September 1995, a flock of Canada geese brought down a U.S. Air Force E-3 AWACS radar plane in Alaska, killing all 24 crew members. These three incidents are among the most unnerving, but contact between birds and airplanes is not unusual. The Federal Aviation Administration received some 4,000 reports of bird strikes last year. The Air Force receives nearly 3,000 additional such reports, and it loses, on average, one aircraft a year. You'd think it would be no contest, bird against massive machine. And yet a one-ounce bird can hit a moving plane with the force of a bullet. And larger birds can cause crippling and catastrophic damage.

An increasing concern about bird-plane collisions brought the Air Force (as well as commercial airlines and engine manufacturers) to the Smithsonian for help. In our Natural History Museum's Department of Vertebrate Zoology, ornithologists Roxie Laybourne and Carla Dove identify the birds that have struck planes. Through their detailed examination of the structures of feathers, and correlations of the identifications with the dates and times of day and the altitudes, longitudes and latitudes of the incidents, they have contributed to an invaluable database. Analysis and interpretation of the data reveal patterns that can lead to preemptive action—such as managing airport habitats more carefully, altering flight patterns and building stronger engines.

The bird remains sent to the museum are often fragmentary indeed. Even so, Dove, drawing on her expertise and experience, can sometimes make an identification outright, without the need for microscopic examination. Lives may depend on the outcome of her observations, and she can know as much as she does only because those aisles of museum cases have been filled so assiduously over the years.

Rarely have the virtues of "excess" been more apparent.



LAWRENCE M. SMALL, SECRETARY

BETTER SOUND THROUGH RESEARCH®

BOSE

With enough knowledge, any problem can be solved.

When Bose® began building factory-installed music systems for cars, conventional wisdom believed the automobile environment was much too hostile for true high-fidelity sound. But we embraced the research challenge of developing smaller, lighter, more efficient equipment. Automatic functions. And through it all, far better sound. That knowledge creates better systems for your home, too. Today, the single piece of Bose equipment shown on the left, about the size of a laptop computer, replaces a shelf full of conventional components. Knowledge. It's the foundation of every Bose product.

KNOWLEDGE

To discover which Bose product is best for you, please call

1-800 ASK BOSE

please request ext.X32 or visit us at

ask.bose.com/wx32

For your home. Your car. Your business. Your life.

©1999 Bose Corporation JN00254

How should a mutual fund pick stocks? Janus puts on mask and gloves and gets under a company's skin. Peels back the superficial reports and data. Exposes the vital workings of

Janus Growth & Income Fund			
ONE YEAR	THREE YEAR	FIVE YEAR	LIFE OF FUND
46.43%	43.90%	37.16%	25.56%

How far can you get with Janus picking your stocks? Slice into these numbers and see for yourself.

★ ★ ★ ★ ★ Average annual total returns and Morningstar overall rating among domestic equity funds as of 3/31/00.

The stock markets performed exceptionally well in 1999 and the Janus funds benefited from that performance. Investors should maintain realistic expectations for future performance. Such performance may not be sustainable. [illegible] Past performance does not guarantee future results. Your shares, when redeemed, may be worth more or less than their original cost.

the business. Extracts every bit of information that could point to a winning specimen.

It takes a sharp eye, and then some. Picking stocks the Janus way is not for the squeamish.

JANUS

Get there.

The Janus Overseas Fund's 3-year and 5-year periods ended 3-31-00. Morningstar proprietary ratings reflect risk-adjusted performance through 3-31-00. Ratings are subject to change every month. Based on an overall rating, it received 4 stars for the 3-year, 5-year and Lifetime periods. Past performance is no guarantee of future results. Investment return and principal value will fluctuate, and shares, when redeemed, may be worth more or less than their original cost. Janus Distributors Inc. Member NASD. SM18 (00-

CROP DUSTERS

AS A PERSON WHO IS CONCERNED about the use of pesticides, I began reading, with some trepidation, Michael Parfit's "The Corn Was Two Feet Below the Wheels" in your May 2000 issue. I was soon caught up in Parfit's prose, however, which soared to the height of poetry and gave me a chance to ride in a crop-dusting plane and see the beauty below and the art of the agricultural aviator's work.

Joan Brausch
Midland, Michigan

WRITER MICHAEL PARFIT AND PHOtographer Chad Slattery did a fine job highlighting both the excitement and the challenges that agricultural pilots face on their jobs.

I found one small error: the satellite tracking system is called the Global (not Ground) Positioning System. At least 70 percent of agricultural pilots use GPS.

James Callan
Executive Director
National Agricultural Aviation Association
Washington, D.C.

HOW COULD YOU NOT MENTION THE scene in Alfred Hitchcock's *North by Northwest* in which a crop duster terrorizes and chases Cary Grant, spraying him as he desperately flees into a Midwestern cornfield?

Chase W. Wolfe
Milwaukee, Wisconsin

FLYING FOXES

THANK YOU FOR "BATTY ABOUT FLYing Foxes" by Derek Grzelewski. While walking through a village adjacent to a monkey forest in Bali, I admired what appeared to be a series of loosely closed umbrellas hanging high in the trees, but were, in fact, fruit bats. I longed to get close to one. On my way back to my car, I saw a fruit bat hanging from the railing of a man's front porch. He gently placed it on my outstretched arm, and its wings indeed felt like the softest, butteriest suede.

Curious about me, too, the bat swung up toward my face, showing his many teeth in a foxy smile. My traveling companion worried that the creature might bite or give me some incurable disease, but I still cherish the encounter.

Beth Surdut
Harvard, Massachusetts

THE BATMOBILE IS JET-POWERED.
BULLETPROOF. FIREPROOF.
AND REACHES SPEEDS OVER 300 MPH.
COULD WE POSSIBLY IMPROVE ON IT?
BATMAN AND ALL RELATED CHARACTERS, NAMES AND INDICIA ARE TRADEMARKS OF DC COMICS ©2000. ©2000 ONSTAR/ ALL RIGHTS RESERVED.

POINTS OF INTEREST

I READ WITH GREAT AMUSEMENT "Bound for Glory" by Bruce Watson. The First Annual Marysville Grand Prix at our annual Strawberry Festival took place in June 1973, and it was run on jury-built, full-sized trikes. The Grand Prix was the brainstorm of Jack Harrington, who was the advertising manager of the *Marysville Globe*, where I was publisher for 30-some years. The races required three laps down and up State Avenue, with a water hazard, a sand trap and some jump-off ramps. The most grueling aspect of the race was the requirement that every entrant gobble a hot dog and then chugalug a beer at three taverns along the course. The races have become much faster with the sophistication of the trikes and the elimination of the tavern stops.

Sim R. Wilson
Marysville, Washington

Contestants in the two "unofficial" races prior to the First Annual Marysville Grand Prix rode child-size tricycles, requiring the adults to loop their legs over the handlebars to reach the pedals. Ed.

THE SQUARE IN THE MIDDLE OF Marysville is called Comeford Park, not Comfort Park. It was named for James Comeford, an agent with the Office of Indian Affairs at the nearby Tulalip Reservation, who with his wife, Maria, opened a trading post in 1872 to serve the many logging camps in the area.

Eugene Lindusky
Marysville, Washington

SMITHSONIAN HIGHLIGHTS

I WAS THRILLED TO SEE THE PICTURE of me dressed in my praying mantis costume, which appeared beneath the announcement of the National Museum of Natural History's Bugfest 2000. Unfortunately, the caption is incorrect: I am not an entomologist. My specialty as a performing artist and sculptor is creating insect costumes out of basketry materials.

Annie Hickman
Chestnut Ridge, New York

WRITE TO SMITHSONIAN

Letters for consideration in this column must include your daytime telephone number, full name and postal address. Transmit mail to LettersEd@simag.si.edu or send it to Smithsonian Letters Editor, P.O. Box 44400, Washington, D.C. 20026-4400. Letters may be edited for clarity and length.

Send queries and comments about the Smithsonian Institution to info@info.si.edu or to VIARC, Public Inquiry Mail Service, Washington, D.C. 20560-0010.

YES.

NOW THE VEHICLE THAT HAS EVERYTHING HAS ONSTAR® IF BATMAN'S AIR BAG DEPLOYS, WE'LL RECEIVE A SIGNAL AND CHECK ON HIM. IF A VILLAIN STEALS THE BATMOBILE, WE'LL TRACK IT RIGHT AWAY AND NOTIFY THE POLICE. WE CAN EVEN SEND REMOTE SIGNALS TO UNLOCK HIS DOORS OR DIAGNOSE HIS ENGINE WHILE HE'S DRIVING. YOU CAN'T GET YOUR OWN BATMOBILE, BUT YOU CAN GET ONSTAR ON YOUR NEXT VEHICLE. TO FIND OUT HOW, CALL 1-888-ONSTAR-7 OR VISIT WWW.ONSTAR.COM.

OnStar

POINTS OF INTEREST

No Return Address

TO THE "DETECTIVES" WHO SOLVE THE MYSTERIES OF ERRANT MAIL, EVERY LETTER IS A HUMAN TALE

BY SUE ALLISON

IT ALL STARTED AFTER I MAILED A THANK-you note that was never received. When I inquired at my local post office, the folks there told me to contact "the dead letter office," and that, to make a long story short, is how I met Vera Rodriguez Schneider, an energetic, black-maned native of Minnesota who works at the U.S. Postal Service's Mail Recovery Center in St. Paul. There are two other centers, one in Atlanta and one in San Francisco. Altogether, the three facilities employ more than 200 clerks who are committed to keeping that old promise to deliver the mail, no matter what.

After spending a day on the job with Vera, I can't imagine how anyone could be more committed than she is. Her shift begins at 7 A.M. in a windowless building that looks like the headquarters of a national association of pack rats. Stuff is piled up everywhere. When she tells me, after taking off her coat and picking up a retractable razor blade, that her job is "fun," I ask. "What's fun about it?"

She starts using her razor blade to slash open packages. It would be a federal crime for anyone other than a mail-recovery clerk to do this. But Vera has to figure out where all of those cartons and boxes—lacking return addresses and unaddressed, incorrectly addressed or unclaimed—are supposed to go, or where they came from. "You get to play detective here," she tells me, her dark eyes twinkling. It can be very rewarding, she goes on, because "when you return things, people are so happy."

Surrounded by objects lost in the mail, Vera Rodriguez Schneider tracks down a sender at the dead letter office in St. Paul, Minnesota.

During the 13 years Vera has been sleuthing, she has returned a great many things: Christmas presents; birthday presents; wedding albums; a grandfather's war medals; a mink coat; a boxful of family mementos; and Tom Nissalke's National Basketball Association championship ring, from 1971, when he was with the Milwaukee Bucks. The ring had been stolen 12 years earlier, Nissalke told Vera when she tracked him down in Salt Lake City.

If you have ever wondered where your errant mail ends up, this is the place: a 30,000-square-foot warehouse, half of it crammed with millions of pieces of paper, the other half a veritable bazaar. Last year, the Postal Service processed 200 billion pieces of mail. Of those, nearly 100 million ended up at a Mail Recovery Center, including 98 million letters and 1.2 million packages that contained computers, camcorders, stereos, x-rays, needlepoint pillows and cuckoo clocks. In one year, Vera sees enough office equipment to start a small company. She's seen a few other things too: drugs, guns, money. "If it's out there,"

dinner for 8, chez marcella: $475

one happy birthday card: $1.95

one leopard-print, peekaboo nightie: $45

still being able to make her blush:

there are some things money can't buy.

for everything else there's MasterCard.®

MasterCard

www.mastercard.com

she says, "we'll see it in here."

A plain brown package lands on her desk—a Christmas present, months late, without an address or return address. Vera opens it to find a wrapped box inside and a card that says, "To Bailey from Brandy." Vera then removes the holiday gift wrapping and discovers Brandy's address written on top of the box. She puts the wrapping paper inside with the present and then makes out an address label to Brandy. "Boy, is she going to be surprised," Vera says.

"The love letters that end up in the shredder! Sometimes they'll be signed, 'Guess who!!'"

Another parcel contains a pair of running shoes. It is addressed to a woman in prison. Most prisons don't accept packages without return addresses, and this package doesn't have one. Inside with the shoes, however, Vera finds a box with an address. So she writes a note, rewraps the package and puts on the address she found. "It's probably a mother sending shoes to her daughter," she says. "Every package, every letter, is a sob story."

She slices open another bundle, this one full of clothes. No one by the name on the address lives at the designated residence, but inside is a typed list, two pages long, of people invited to the "Hickerson Family Reunion" in Boston with phone numbers. Vera will use that list to help her track down the right person.

After her break, Vera takes me to the back of the warehouse and shows me where all of the stuff that can't be returned or donated to charity is sorted for auction. An auction is held at each Mail Recovery Center every six to eight weeks. On the way, we pass stacks of unreturnable letters—3,600 pounds of them are received here each day. They are headed for the shredder. "If you could see the love letters that end up in the shredder!" Vera says. "The romances that are lost! Sometimes they'll be signed, 'Guess Who!!' Well, guess what? Shredder!" She shows me one of the envelopes—no address, no return address, no clues inside—and shakes her head sadly at the all-too-avoidable miscommunication.

At the loading bays, semitrailers are arriving, one after the other, and sorters are unloading them. Any parcel that is insured or looks personal goes to Vera or her coworker Barb. At the sorting belt, I ask Vera, Barb and several of their colleagues about the most unusual things they have encountered. Barb says it was an alligator skull still covered with flesh. Vera recalls coming across a Super Bowl ring that belonged to football coach Bill Parcells, who was sending it back to a jeweler to have it resized; the address label had fallen off, but Parcells' order was inside.

"A lot of things touch you," Terry says. "One time I found a diamond-and-gold brooch postmarked from Missouri but with no 'To' or 'From' address, only a note inside saying, 'This was my mother's wedding gift from my father in 1898.' That was pretty sad to me." They kept the brooch for a year and a half, hoping someone would submit a claim. Finally, when no one did, the Postal Service sold it at an auction. They hold onto sentimental things the longest, Vera says.

Someone comes up and shows me two hand-written letters, stapled together, that could have inspired an O. Henry short story. One is written to a youth named Lee Sandro. The other letter is one Lee Sandro had printed in his childish handwriting and put in a bottle he tossed into the Atlantic Ocean off the coast of New Jersey. Lee had the presence of mind to include his full name and address so the finder of his note could write back. But by the time his letter washed up on a beach in Florida two years later, Lee had moved and his parents left no forwarding address. His would-be correspondent, who signed the note only "Dreamer in Florida," neglected to provide a return address. Both letters ended up in St. Paul.

I watch Vera open a package incorrectly addressed to a person in Minneapolis. Inside is an old mandolin. There is no explanatory note or return address. Vera puts it on a shelf, where it will remain until someone calls or until she decides it's time to auction it off.

Every morning when she starts work and every afternoon when she leaves, Vera pauses by the supply shelf to pay her respects. There, between a case of sodas and a large bottle of aspirin, reposes a small bronze cremains box with the inscription "W.C.G. McLeod, 1891-1977." Vera introduces me to "Uncle George," as she calls him. He was there the day she first reported for work and she guesses he'll probably still be there when she retires. It's not such a bad place to end up, really, but each day Vera wonders: "Why isn't anyone looking for Uncle George?"

As land

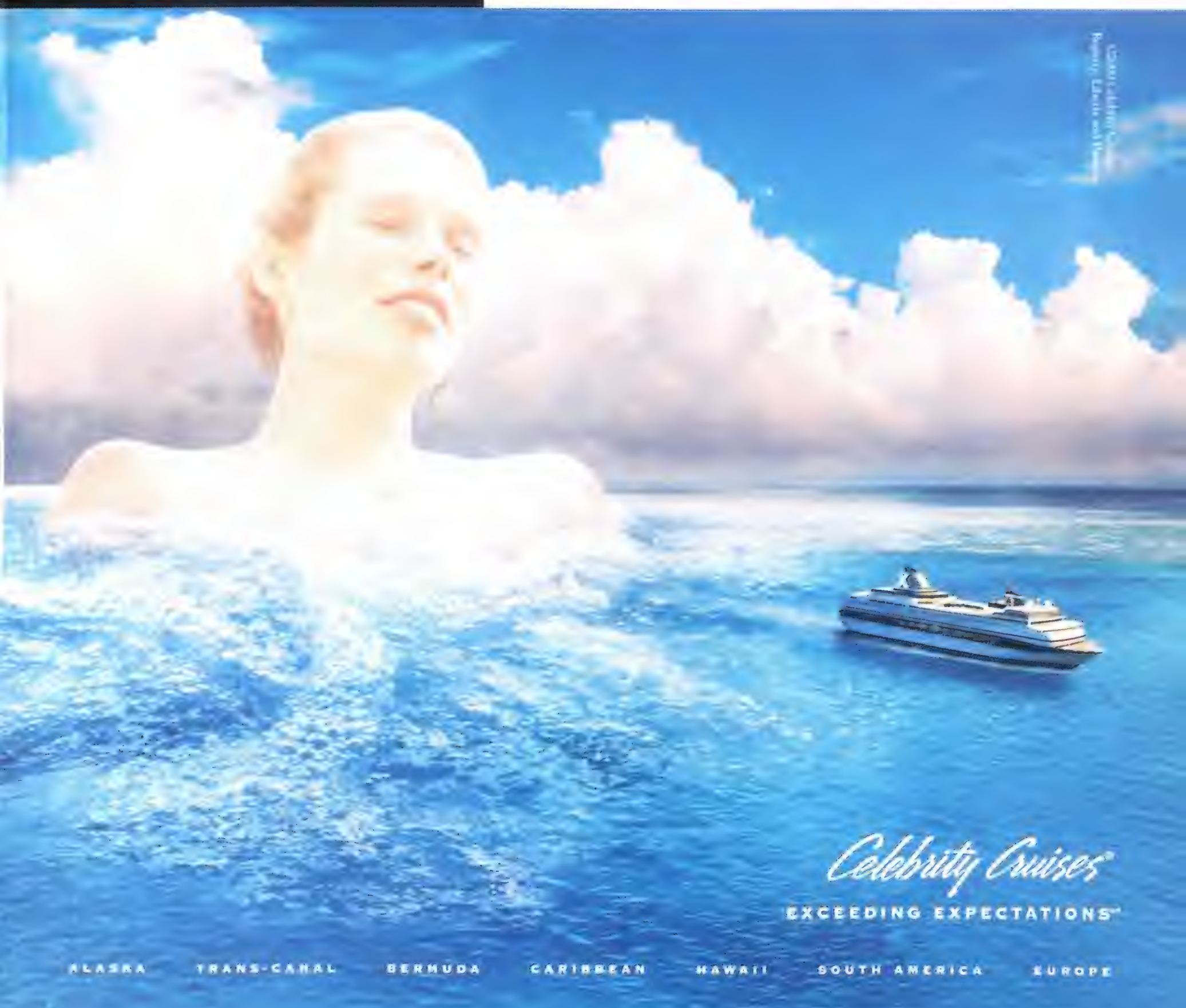
DRIFTS

AWAY

so can you.

Slip into a hydrotherapy bath or
melt under a reflexology massage.
Be pampered by AquaSpa,
the most luxurious spa at sea.
And to all of life's little tensions,
say bon voyage.
For reservations, call your travel agent
or 1 800 CELEBRITY ext. 73
Or visit www.celebritycruises.com

The highest rated premium cruise line in the world.
Sea Life on a Different Level



Celebrity Cruises®

EXCEEDING EXPECTATIONS™

ALASKA TRANS-CANAL BERMUDA CARIBBEAN HAWAII SOUTH AMERICA EUROPE

THE OBJECT AT HAND

Our Flag Was Still There

IT'S THE STAR-SPANGLED BANNER; THE ANTHEM IT INSPIRED PLAYS ON AS A MUSICAL SALUTE TO THE STARS AND STRIPES

BY EDWARDS PARK

EVERY HOUR IT USED TO APPEAR, THIS ghost from the past. A curtain would fall to reveal it, filling an entire wall of the National Museum of American History's great lobby at the Mall entrance. It was, of course, the huge American flag that flew over Baltimore's Fort McHenry on a hot summer night in 1814. "Was," because this object at hand, the original Star-Spangled Banner, is no longer "still there." The effects of age brought it down—something the British failed to do 186 years ago.

That giant flag, one of the Smithsonian's proudest treasures, is being cleaned and perked up in a large room about 150 feet away, and you can see it happening. Look into the conservation lab, and there's the old flag stretched out as though waiting for the surgeon to scrub up. But it's a team of conservators who do the operating here, sitting beside the fragile fabric, inching carefully around it, examining every flaw. They'll finish in 2002, they say.

An exhibition along the concourse offers enough background to challenge many notions you may have cherished about the glories of the War of 1812. One episode that's hard to forget, much as we'd like to, is the sack of our national capital in 1814. A British landing force put ashore from the Chesapeake Bay, marched inland in the humid heat of August and headed for "Washington City." We scraped up all the militia we could, and ventured to meet the invaders at the suburb of Bladensburg. At first glimpse of approaching redcoats with bayonets aglitter, most of us scampered home as fast as our weary legs could take us. The battle became known as the Bladensburg Races.

Held captive by the British during an all-night bombardment of Fort McHenry, Francis Scott Key exulted as the sun rose to reveal the American flag still flying.

The British were tired too, but they pressed on to Washington, burned the Capitol and many other buildings, and stormed into the White House. Before setting it ablaze, the officers sat down to a sumptuous dinner laid out for President and Mrs. James Madison, who had hastily departed, Dolly Madison clutching Gilbert Stuart's portrait of George Washington.

Though the war was hardly our finest hour, it did have its moments, and that's where the flag now at the Smith-

Apparently art appreciation extends beyond museum walls.

Appreciating the fine lines and exquisite details of Park Avenue Ultra can make anyone a connoisseur. But beyond its own beauty, Park Avenue Ultra appreciates the other arts too. With the available concierge service* from OnStar,℠ Advisors can assist you with museum events, theatre tickets and reservations to the most exclusive places around. In all, an indispensable tool that those who love the arts will appreciate.

Park Avenue by Buick
luxury. pure and simple.™

www.parkavenue.com or 1-800-4A-BUICK

*One-year Safety and Security Plan is standard on 2000 Park Avenue with the SE Package and Ultra models. Concierge services available at an additional cost as part of the Premium Service Plan and are available from 8 a.m. to 12 a.m. EST. Call 1-800-ONSTAR-7 for system limitations and details.

OnStar

©2000 GM Corp. All rights reserved. Park Avenue is a registered trademark of GM Corp. OnStar is a registered trademark of OnStar Corp. Buckle up, America!

This time things fell apart for the British. Snipers quickly picked off their general.

sonian made its bow. Leaving Washington smoking, the British troops, flushed with success (and wine), marched toward the Bay to rejoin their fleet and attack the vital seaport of Baltimore. We Americans, humbled but angry, finally rose to the occasion. Capable leaders appeared and strengthened Baltimore's defenses, beefing up Fort McHenry, which guarded the harbor, adding shore batteries. More militia arrived from Pennsylvania and Virginia, and a regiment of regulars showed up.

Earlier, in the second year of the war, Fort McHenry's new commander, Maj. George Armistead, had asked for a suitable flag to fly above it, "so large that the British will have no difficulty in seeing it from a distance." The request was granted, and Mary Pickersgill, who supplemented her widow's mite by making flags for Baltimore ships, started fabricating a standard-sized garrison flag—42 by 30 feet, with 15 stars stretching 26 inches across and two-foot stripes—15 of them, since the number of stripes didn't revert to the original 13 until 1818.

Conservators at the Smithsonian's National Museum of American History expect to be finished with their painstaking work on the Star-Spangled Banner in 2002.

Now the British were really coming. Glutted with victory, and dead tired, they encamped at Upper Marlborough. On the way to Washington, they'd usurped the manor house of Dr. William Beanes, a feisty 65-year-old, eminent in his profession. Now, as the British reached town again, roistering redcoats disturbed Beanes and his dinner guests. They went out to stop the noise and got the drunk soldiers jailed. For this, the British brass ordered that Beanes be taken prisoner.

Aghast, the doctor's friends set about trying to get him released. A parley with the British command called for a skillful negotiator, able to exert charm yet put generals and admirals firmly in their place . . . Aha! Francis Scott Key!

Key was one of those people who knew everybody. By 1814, he was a lawyer and a popular success, with a wealthy wife and a fine home in Georgetown, the rich old neighbor of muddy little Washington. He liked to scribble poetry—a not unusual diversion two centuries ago. He was a godly man, a pacifist who hated this war yet served as an officer in a Georgetown artillery company. Altogether, this able, likable, well-connected dilettante was the perfect choice for an extremely dicey—if not impossible—mission.

Letters were exchanged across the battle lines. Grudgingly, the British agreed to let Key and Col. John Skinner, in charge of prisoner exchange, make their plea if they could meet the British fleet, sailing up the Chesapeake. Key and Skinner hailed the British flagship from their small vessel, were taken aboard and learned that Beanes was in danger of being hanged. Key went to work, pointing out that the doctor had treated wounded British soldiers with the same care and kindness as he had Americans. That won over the British command. Dr. Beanes could go, but he and his rescuers must stay with the fleet until Baltimore went the way of Washington. Under a guard of marines, Key's party ended up in their vessel, towed by the British flagship as it surged up the Bay.

On September 11, the British fleet came together—50 vessels, ranging from the 80-gun flagship through 74-gun men-of-war, 38- and 36-gun frigates, to rocket and bomb ships (actually huge rafts). Transports carried "Wellington's Invincibles," the 4,000 or so troops who had so enjoyed themselves in Washington.

Early on the morning of the 12th, the redcoats landed east of Baltimore and charged the massed militia. And this time things fell apart for the British. Two American snipers quickly picked off the British commanding general, and although some militiamen skedaddled, many others stuck it out. Humid, rainy weather helped the American cause. The Invincibles pulled back and encamped, waiting for the navy to do its stuff. The ships would first have to put out of action that pesky Fort McHenry.

Next morning, in pouring rain, bomb ships opened fire

It's a new dawn where organic meets great taste.

We've taken all the goodness of organic grains, lightly sweetened them with pure golden honey and brought it to your breakfast table for your enjoyment. Great tasting and organic. That's the Sunrise difference. Be sure to make it the beginning of your morning!

Look for Sunrise™ in the main cereal aisle of your grocery store. Visit us at www.sunrisecereal.com.

thunderously from about two miles below Fort McHenry—well out of range of its guns. Mortar bombs, some of 200 pounds, soared high in the air and plunged into the fort to explode in showers of rubble. Key, Skinner and Beanes had a distant view from their small vessel. They made out a flag, limp in the soggy air.

All day the guns bellowed. Newly introduced Congreve rockets screeched toward the fort in hopes of starting fires. When enemy "bomb," or mortar, vessels moved in to score even more hits, the Americans opened up with everything they had and drove the British back.

Night fell. The tremendous bombardment eased off as boatloads of British troops slipped past the fort to attack the city. The Americans spotted the foray, and their guns roared, and again the British had to pull out of range. Desperate to finish off the fort, they redoubled their cannonade, bombs curling high in the night sky, their lit fuses streaking across it, then down to their bright burst. Key, tirelessly watching, realized that the roar of British guns meant the fort still held; by the burst of bombs he could see the flag, still there.

The rain had ceased, and he made out the red of the stripes, the blue square. The American flag.

And, in the faintest first light of dawn, at about the time the British command called off its Baltimore campaign, he spotted it. The rain had ceased; a stirring of wind opened it, and he made out the red of the stripes, the blue square. The American flag.

As a poet, Key could be suddenly and deeply moved, and instinctively he'd create rhythmic phrases to describe his feelings. All night, words had tumbled in his head: proudly hailed . . . gallantly streaming . . . bombs bursting in air . . . gave proof . . . Still there! Now he scribbled them on the back of a letter, then later, safely ashore in Baltimore, he wrote out and polished the song. Of course it had to be a song.

The phrasing of "Defence of Fort McHenry," as he first named it, fitted perfectly an old favorite: "To Anacreon in Heaven." This was the song of a popular London gentlemen's club, the Anacreontic Society, honoring an ancient Greek poet who lyricized life's joys. Members devoted themselves to good food, good wine, good cheer. They'd composed a pleasant, lilting tune, and one of the club's presidents had supplied words, a fanciful communication with Anacreon, fun to sing:

To Anacreon, in Heav'n, where he sat in full glee,
A few sons of harmony sent a petition,
That he their inspirer and patron would be;
When this answer arriv'd from the jolly old Grecian—
"Voice, fiddle, and flute,
No longer be mute;
I'll lend ye my name, and inspire ye to boot;
And, besides, I'll instruct ye, like me to intwine
The myrtle of Venus with Bacchus's vine."

The music was a hit in America. A patriotic song, "Adams and Liberty" (later changed to "Jefferson and Liberty"), adopted the tune, which was also used for a song celebrating the naval war against Barbary pirates, early in the 19th century: "When the warrior returns, from the battle afar, To the home and the country he nobly defended. . . ." And who had written that? Francis Scott Key.

"The Star-Spangled Banner" was popular, but not our national anthem. Not until 1931 did Congress grant that status. Before that we'd made do with "My Country 'Tis Of Thee," our version of "God Save the King (Queen)" as an anthem. (Many people still regret that "America the Beautiful" wasn't chosen.) But Key's song, played more slowly than the original song, with a few crashing chords and drumrolls, works well because it deals with our flag. We Americans don't have a king or queen. We have a flag.

The Smithsonian got this one in 1907, as a loan from Armistead's grandson that turned into a gift. A strange red *V* may have been the start of an *A* for Armistead. Some missing pieces were probably snipped out for souvenirs. They were likely not shot away during the bombardment. In that rain, the flag would have drooped against its mast with little chance of being hit.

In fact, some experts believe that the giant Pickersgill flag wasn't raised at all until that clear morning when Key saw it; another banner had flown in the rain. The impact on Key as the morning breeze finally revealed the enormous emblem of his beloved country—beaten, scoffed at, but still in the fight—must have been explosive.

Even in these cynical days, Americans who have lived abroad for a while, and suddenly meet the Stars and Stripes, feel a wrenching emotional surge—the pulse quickens, breath shortens, the throat tightens. In Alice Duer Miller's narrative poem "The White Cliffs," an American girl, living in England during World War I, feels Britain's anger and dismay at our continued neutrality during three years of suffering. Then the American doughboys arrive on their way to the trenches:

Marching through London to the beat of a boastful air,
Seeing for the first time Piccadilly and Leicester Square,
All the bands playing: "Over There, Over There,
Send the word, send the word to beware—"
And as the American flag went fluttering by,
Englishmen uncovered, and I began to cry.

CHARLEWOOD GOLF CLUB
2222 MAGNOLIA WAY
WALNUT CREEK, CA 94595

Total $1,298.56

The New GM Card rewards you 5% on every purchase, making it the fastest way to save toward the GM car or truck of your dreams.

Charge toward new cars and trucks from Chevrolet, Pontiac, Oldsmobile, Buick, Cadillac and GMC. You can even take advantage of great new travel, entertainment and retail specials. The choice is yours.

The New GM Card.
No Annual Fee. 5% Earnings.
Call 1-888-8GM-CARD.
www.gmcard.com

THE NEW GM

What are you charging toward?℠

SMITHSONIAN

HIGHLIGHTS

It's a Drum

This 5-foot-6-inch towering pole drum can be seen this summer at the Arthur M. Sackler Gallery in an exhibition of ancient Chinese musical instruments. The instruments were recovered in 1978, when soldiers clearing ground for a new factory discovered a chambered burial pit. Inside was a cache of 2,500-year-old bells, drums, chime stones, zithers and flutes, some still in good playing condition. This drum and pole are modern reproductions of the originals, which broke in half as the tomb was opened. The bronze base, however, is original. Its swirling tangle of biting dragons was once inlayed with turquoise to create a dazzling gold-and-blue effect. "Music in the Age of Confucius" is on view through September 17.

—*Beth Py-Lieberman*

Exhibitions and Events

ART NIGHT ON THE MALL

African Art, the Hirshhorn, the Sackler, the Freer and the International Gallery are open until 8 P.M. on Thursdays, through August 31.

SPECIAL HOURS

Through Labor Day, the Natural History Museum's Atrium Café and the main Museum Store are open daily, 9 A.M. to 7:30 P.M.; the Imax theater box office is open daily, 9 A.M. to 6:30 P.M. The Air and Space Museum opens at 9:30 A.M. daily, through December 31.

NATIONAL MUSEUM OF AFRICAN ART

Audible Artworks: Selected African Musical Instruments (through April 8, 2001) Audio stations provide samplings.
Transatlantic Dialogue: Contemporary Art In and Out of Africa (through September 3) Artworks that represent a cultural exchange between eight contemporary African artists and eight African-American artists and their shared influences and experiences.

INTERNATIONAL GALLERY, S. DILLON RIPLEY CENTER

Piano 300: Celebrating Three Centuries of People and Pianos (through March 4, 2001) Features a variety of piano designs dating back to c. 1700.

ARTS AND INDUSTRIES BUILDING

Ritmos de Identidad: Fernando Ortiz's Legacy & the Howard Family Collection of Percussion Instruments (through August 1) A bilingual exhibition featuring 150 percussion instruments.
Reflections in Black: A History of Black Photographers, 1840 to the Present (through July 23) Showcases more than 300 images.

NATIONAL MUSEUM OF AMERICAN HISTORY

Rube Goldberg: Comic Art and Invention (July 24 through October) Pen-and-ink drawings and a model for an alarm clock illustrate the whimsy of maximum effort for minimal results.
This Land is Your Land: The Life and Legacy of Woody Guthrie (through August 13) Works illustrate the life of the singer-songwriter who influenced generations of musicians.
An American Diary (through September 4) A series of small paintings by Roger Shimomura inspired by diary entries made by his grandmother during World War II.
Fast Attacks and Boomers: Submarines in the Cold War Learn about submarines through graphics, artifacts and hands-on interactives.

Mother Nature's Treadmill
Mother Nature's Energy Bar
NATURE VALLEY
OATS 'N HONEY
The crunchy 100% natural energy source made from whole grain oats.
The Energy Bar Nature Intended.®
© GMI 1999 Nature Valley is proud to have donated $240,000 to The Nature Conservancy since 1998.

PAN BINGYUAN/HUBEI PROVINCIAL MUSEUM

Your Choice! 10- or 15-day cruises through **Tahiti & the South Pacific** aboard Renaissance Cruises' brand-new, smoke-free R-Class Ships featuring spacious cabins and suites – 70% with balconies at irresistible **2-for-1 prices.**

Tahiti • Moorea • Huahine • Raiatea • Bora Bora • and more…

10-DAY CRUISE SAIL DATES
November 3, 13, 23 • December 3, 13, 23, 30
from only $1,499 per person

15-DAY CRUISE SAIL DATES
November 15, 30 • December 15
from only $1,999 per person

Low international air available.
Call now…availability is limited.
Toll free **1.888.234.3261**

NATIONAL MUSEUM OF NATURAL HISTORY

Selections from Forces of Change: A New View of Nature (through October 9) Large-format photographs from a new book of the same title that examines the geological, environmental and cultural processes shaping our world.
Vikings: The North Atlantic Saga (through August 13) New archaeological finds that redefine the year 1000.

NATIONAL AIR AND SPACE MUSEUM

R. G. Smith: The "Old Master" of the Sky (through September 5) The history of flight re-created on canvas.

HIRSHHORN MUSEUM AND SCULPTURE GARDEN

Directions—Cathy de Monchaux (July 14 through October 26) Sculptures in brass, suede, chalk and paper by this British artist.
Ed Ruscha (through September 17) Works by the Los Angeles artist, including several recent canvases.

RENWICK GALLERY, SMITHSONIAN AMERICAN ART MUSEUM

The Art of John Cederquist: Reality of Illusion (through August 20) Thirteen playful, multidimensional pieces.
The Renwick Invitational: Five Women in Craft (through August 20)

NATIONAL POSTAL MUSEUM

Recounting Roosevelt Presentation Albums, 1903-1905 (July 26 through February 23, 2001) Albums of stamp die proofs that were given as favors by President Theodore Roosevelt.

ARTHUR M. SACKLER GALLERY

The Heroic Past: The Persian Book of Kings (through October 29) Historic figures in a legendary Persian poem are revealed in paintings, ceramics, coins and manuscript illustrations.

FREER GALLERY OF ART

Brushing the Past: Later Chinese Calligraphy from the Gift of Robert Hatfield Ellsworth (through January 2, 2001)
The Dragon's Moan (through October 1) Works celebrating the *qin*, or zither.

NATIONAL ZOOLOGICAL PARK

Vanishing Pollinators (through May, 2001) Biology teacher Carll Goodpasture's 34 stunning photographs, on view at the Amazonia Science Gallery and the Visitors Center, portray the beauty and grace of flowering plants and their threatened insect pollinators.

GEORGE GUSTAV HEYE CENTER, NATIONAL MUSEUM OF THE AMERICAN INDIAN [NEW YORK CITY]

Reservation X: The Power of Place (through August 20) Native artists from Canada and the United States explore life in their community and in mainstream society.

COOPER-HEWITT, NATIONAL DESIGN MUSEUM [NEW YORK CITY]

National Design Triennial: Design Culture Now (through August 6)

FOLKLIFE FESTIVAL ON THE NATIONAL MALL

This year's Folklife Festival features cultural traditions from Washington, D.C., Tibet and the regions along the 2,000-mile Rio Grande. The festival runs through July 4.

CLOSED FOR RENOVATIONS

The Smithsonian American Art Museum and the National Portrait Gallery are closed for the next three years. The Anacostia Museum Gallery reopens next spring.

SMITHSONIAN Website

WWW.SMITHSONIANMAG.SI.EDU

At the Magazine's homepage, click on "Events" to go to the calendar and view on-line versions of Smithsonian exhibitions and the Websites of all the museums. Our on-line gallery features other instruments that are on view in "Music in the Age of Confucius" (p. 28).

Tahiti...

It's more exciting than you think!

Optional Shore Excursions:

- Outrigger Canoe and Snorkel
- Glass Bottom Shark Feed
- Waverunner
- Beach Feast
- Guided Car Tour
- Private Catamaran Charter
- Guided Bicycle Tour
- 4x4 Safari
- Parasailing
- Dolphin Watching Expedition
- Helicopter Tours

Call now...availability is limited.
Toll free **1.888.234.3261**

Renaissance Cruises

Battling the Ora

EVEN WITH AIR POWER
AND SATELLITE TRACKING,
IT STILL TAKES PEOPLE
WITH AXES AND SHOVELS
TO STOP A FOREST FIRE

ngeMonster

BY EDWIN KIESTER, JR. ◆ PHOTOGRAPHS BY ED KASHI

AT 1:23 A.M. THAT AUGUST Monday, Duane Fry was awakened by a loud rumble and a bright light. "I thought a car had come through the wall," he joked afterward. A genial bear of a man who heads the Shasta-Trinity unit of the California Department of Forestry and Fire Protection (CDF) in Redding, Fry recognized that the light and noise added up to summer lightning, thunder—and trouble. "I knew we were going to have our hands full," he said.

Fry did not get much sleep that night nor in the harrowing days to come. Between his rude awakening and 6 A.M., more than 500 lightning bolts touched down in the two rugged, forested Northern California counties that are Shasta-Trinity's jurisdiction. Many more whacked adjoining counties and the national forests to the north, lighting up the sky like London during the Blitz—a total of 3,000 "dry lightning" strikes in five hours. At dawn, from her lookout tower atop 2,600-foot Bear Mountain, Vickie Lamoureux could see "dozens of smokes in every direction" where the fusillade had ignited dry grass, brush and treetops, threatening homes, towns and timber.

Across Northern California, CDF firefighters girded themselves for another offensive. That battle was to go on every day, and night, for two nightmarish months, what Fry was to call the worst fire season in Shasta-Trinity history.

To watch the firefighting army battle the "orange monster," as I did from August through October, is to witness a mobilization and combat that would do credit to the officers and troops who fought the Gulf War. The CDF commands approximately 1,000 vehicles, 600 fire stations, 50 aircraft and 3,500 firefighters in bright yellow, fire-resistant "banana-man" suits; this force is augmented by specially trained prison inmates dressed in orange. Together they must protect 51,000 square miles, about one-third of the nation's most populous state, sharing responsibility with the U.S. Forest Service, which guards national forests and other federal lands. The two agencies exchange information, equipment and personnel, and commonly work side by side against

major fires. During California's dry season, stretching from April to November, these teams face an average of 7,500 wildland fires, most caused accidentally by human activity.

But 1999 was not your average year. There had already been 6,000 fires by August, nearly 1,000 more than the five-year average. "We've been in a state of siege since May 15," Fry said. All days off had been canceled, and vacations scrubbed.

Conditions in late August were ripe for disaster. When I stepped out of my car at Fry's Redding headquarters at 11 A.M., the temperature read 98 degrees Fahrenheit, on its way to 110. The humidity was below 10 percent. A signboard boldly proclaimed a "red flag" warning, the highest level. "It's dry, dry, dry," Fry said worriedly.

A wall-size map of California dominated the hastily staffed information center in the unit headquarters. A blizzard of red spots marked individual fires. An accompanying chart ranked them by size, location and priority. At least 250 lightning-caused fires were actively burning.

A major fire in nearby Butte County, which had caused residents to flee the towns of Cohasset and Paradise, was given top priority because of the threat to lives and property. In second place came the "Rock Fire," 30 miles east of Redding in Shasta-Trinity territory. Brian Weatherford, a retired CDF unit chief who is a walking encyclopedia of fire lore, had been assigned as my guide. Weatherford handed me my personal banana-man suit, helmet, goggles and safety tent, which I was to quickly set up and crawl into if flames threatened to engulf me. "Let's go," he said.

"Wildland firefighting," Weatherford told me as his truck jounced toward the fire, "is part science, part witchcraft and part sheer luck." Firefighters today are armed with high-tech weapons—Global Positioning System receivers to determine the precise location and size of the fire, heat-sensing aircraft to penetrate smoke and trace the fire's perimeter, a computerized multiple-incident response system to track every piece of equipment, squadrons of fixed-wing aircraft and helicopters to fight the fire from above. Fire meteorologists identify microclimates plus updrafts and downdrafts created by the fire. Fire-science specialists are knowledgeable about burn rates of varied vegetation and on north-facing versus south-facing slopes.

Firefighters in Shasta County, California, carry special equipment for cutting firebreaks. Two at left wear chain-saw chaps.

Still, Weatherford explained, successful firefighting depends primarily on men and women with hoses, chain saws, axes, shovels, bulldozers and fire engines. "And on energy and adrenaline," he added.

Trudging over the blackened, smoldering terrain where the fire had started, I could see why the Rock Fire ranked so high on the list. It had started in highly combustible grassland and sunbaked manzanita at the western end of a narrow canyon, the intense heat stripping trees and brush of their foliage and leaving charred skeletons rising from a carpet of gray ash. A plume of smoke showed the fire moving rapidly eastward, directly toward a cluster of retirees' homes. Further east stood a Boy Scout camp and beyond that, rich stands of timber. An advance to the north would threaten the village of Shingletown and more commercial forests; a move south would menace the hamlet of Manton. Calamity loomed in every direction.

The fire had been reported about 1 P.M. Battalion Chief Mike Bertagna quickly called up a first-response team of engines; alerted the CDF North Operations Center, "North Ops," whose task was to mobilize and deploy forces from 18 counties in the Coast-Cascade region as requested by unit chiefs; and notified the CDF air wing. Battalion Chief Bill Britton was directed to take charge.

Britton quickly discovered that he had few weapons. "Listen, with all these fires, everybody was clamoring for resources," he said, using the firefighters' term for crews and mechanized equipment. As rapidly as North Ops summoned help from nearby counties, resources were being diverted to the other fires. Britton found only four local volunteer engine companies and two volunteer water tenders. There were no inmate hand crews or bulldozers to carve out firebreaks or clear out brush. Britton could only look to the skies for support.

An aggressive air attack normally comes first in a CDF battle plan. By quickly encircling a fire with flame-retarding chemicals dropped from air tankers, then following up with water drops from helicopters directly on the flames, the CDF air wing tries to confine 90 percent of fires to ten acres or less. The retardant, primarily the fertilizer diammonium phosphate dyed a bright red so pilots can see it from above, coats vegetation with a lasting, sticky moisture that cools it, reduces its flammability and hampers the fire's spread. Swooping in only 100 feet above the treetops, often feeling their way through thick smoke and violent updrafts, the tanker pilots can stitch a remarkably accurate battle line.

Splashing a stream of 800-plus gallons of scarlet liquid from the air onto a blazing landscape makes for a spectacular show, but it is not a task for the fainthearted, as I had earlier discovered. The backbone of CDF's air fleet is a squadron of Grumman S-2 military aircraft, reconfigured with a retardant tank in the fuselage. It is strictly a one-man show. "We can't put you up in a tanker, because we can't have anything to distract the pilot," Duane Fry had told me. "But we can simulate a run to show you how it's done."

Thus I sat behind pilot Bill Buckley. Buckley's Bronco is normally the headquarters of a fire's air attack commander, circling 800 to 1,000 feet above the fire and directing the tankers and helicopters.

"We never drop uphill," pilot Buckley's voice crackled over the intercom. "You don't want to have a mechanical problem and find yourself flying into the terrain." Selecting a wooded rural road as his presumed target, he now brought the Bronco in straight and level over the imaginary flank of an imaginary fire.

Lookout Vickie Lamoureux takes a bearing on a smoke from atop Bear Mountain. She'll notify the command center in Redding.

"Right about here," he said, "we would let go. It's kind of an art form. When the drop point passes under the nose of the plane, you release. You stay on track until the tank is empty, and then you move off for the next guy and go back to the base to reload." A reloading circuit takes about 20 minutes, which is why CDF floods the skies "heavy and early," in Buckley's term, to provide a nonstop assault to halt the fire in its tracks.

From this command center Duane Fry directs state firefighters in Shasta and Trinity counties. There's not much rest in fire season.

"We try to keep the fixed-wings on one side of the fire, the helicopters on the other, and bring them in one at a time," he explained. "Sometimes five or six on either side of the fire, a quarter of a mile and a few hundred feet apart." He chuckled. "It's not exactly FAA-regulated airspace." But isn't this kind of close-in maneuvering dangerous? I couldn't see Buckley's face, but his voice sounded grim. "I've been doing this 25 years, and there have been 32 crashes," he said. "We are getting better. Our number one rule still is, 'Go home to your own bed every night.'"

On the first day of the Rock Fire, however, a heavy-duty aerial attack was out of the question. Battalion Chief John Watt, a voluble veteran of 30 years, was flying with Buckley as the air attack commander that day. Thanks to the multiple fires needing air support, Watt's forces, too, were woefully under strength. Two tankers and a helicopter were all he could muster. Watt sent the tankers across the head of the fire and around the threatened residences, then repeatedly brought in his lone helicopter to drop 350 gallons of water.

"The air show wasn't enough," Britton said ruefully, when we caught up with him later. "We could snub the fire, but we couldn't keep what we gained. It kept running around the retardant line. We needed ground troops. We needed people with hoses, axes, bulldozers, fire engines, to build a line and cut off the head of the fire. And we didn't have them."

The cavalry was coming, however. At 5 A.M. Lee Winton, the stocky, sandy-haired battalion chief in the Amador-El Dorado unit, 200 miles south, had been told to hurry his strike team of five engines and 18 firefighters north to Butte County. Just south of Redding, North Ops switched him to the Rock Fire. When his procession of engines rumbled into the staging area, the beleaguered Britton practically embraced their leader. The two were good friends. Britton asked Winton to take command of the fire's southern flank, protecting homes along Woodcutters Way and blocking the fire's potential advance toward Shingletown.

It was now after 3 P.M. Winton was not encouraged by what he saw. "We could see the brown smoke and hear the crackle before we ever got near the fire," Winton says. "It had moved out of the light brush into the heavier stuff. We had 40-foot Digger pines and oaks going up like Roman candles, torching and throwing embers and burning stuff everywhere. We had spot fires a quarter mile ahead of the main fire. Bill [Britton] was saying 500 acres were involved. I wouldn't have been surprised to see it go to a thousand."

Winton dispersed hose handlers along Battleview Drive, trying to establish a fire line perimeter. But, like Britton, he was frustrated by the lack of hand crews and bulldozers and the limited air support. Then, just after 4 P.M. two boxy red vans carrying inmate crews from his home territory pulled up. They were closely followed by two bulldozers and engines from the Office of Emergency Services (OES), vehicles donated by the state for local use with the proviso that they are on call for major fires. Winton assigned the dozers to carve a fuel break behind Battleview, and the

pick-and-shovel crews to scratch a secondary position, so that he had created what he called "a pretty shaky fire line." The OES engines and some of the crews would protect homes.

The inmates are mostly minor offenders, although a few are murderers whom no one expects to kill again. They are specially trained and live in the conservation camps year-round. Duane Fry says of them: "They're really the backbone of our operation. The fire stations have the engines, but the inmates are the ones who go into the steepest, ugliest areas where bulldozers cannot go."

A Lockheed C-130 tanker drops flame retardant around a fire in Tehama County. The plane can carry 3,000 gallons.

As the flames swept up-canyon, Shasta County deputy sheriffs had passed along Woodcutters Way urging residents to evacuate to a temporary shelter. Some chose to stay. Patricia Totman was driving home when she spotted smoke and flames across the valley. "Our place is on fire," she exclaimed to herself. Arriving at home, she was relieved to find the house standing, but husband Jack was frantically hosing down the nearby shrubbery. As the flames approached the low, hilltop home, inmate crews and a fire engine arrived. The crews quickly cleared brush within 30 feet of the house, moved a woodpile and dug an encircling trench. "That stopped it," a grateful Totman said. "My hat is off to these guys. If it hadn't stopped . . . "

As reinforcements continued to arrive, the firefighters at last seemed to be making headway. Winton's shaky line held, and below the head of the fire, the crews were pinching in its shoulder. And then, abruptly, the fire struck back.

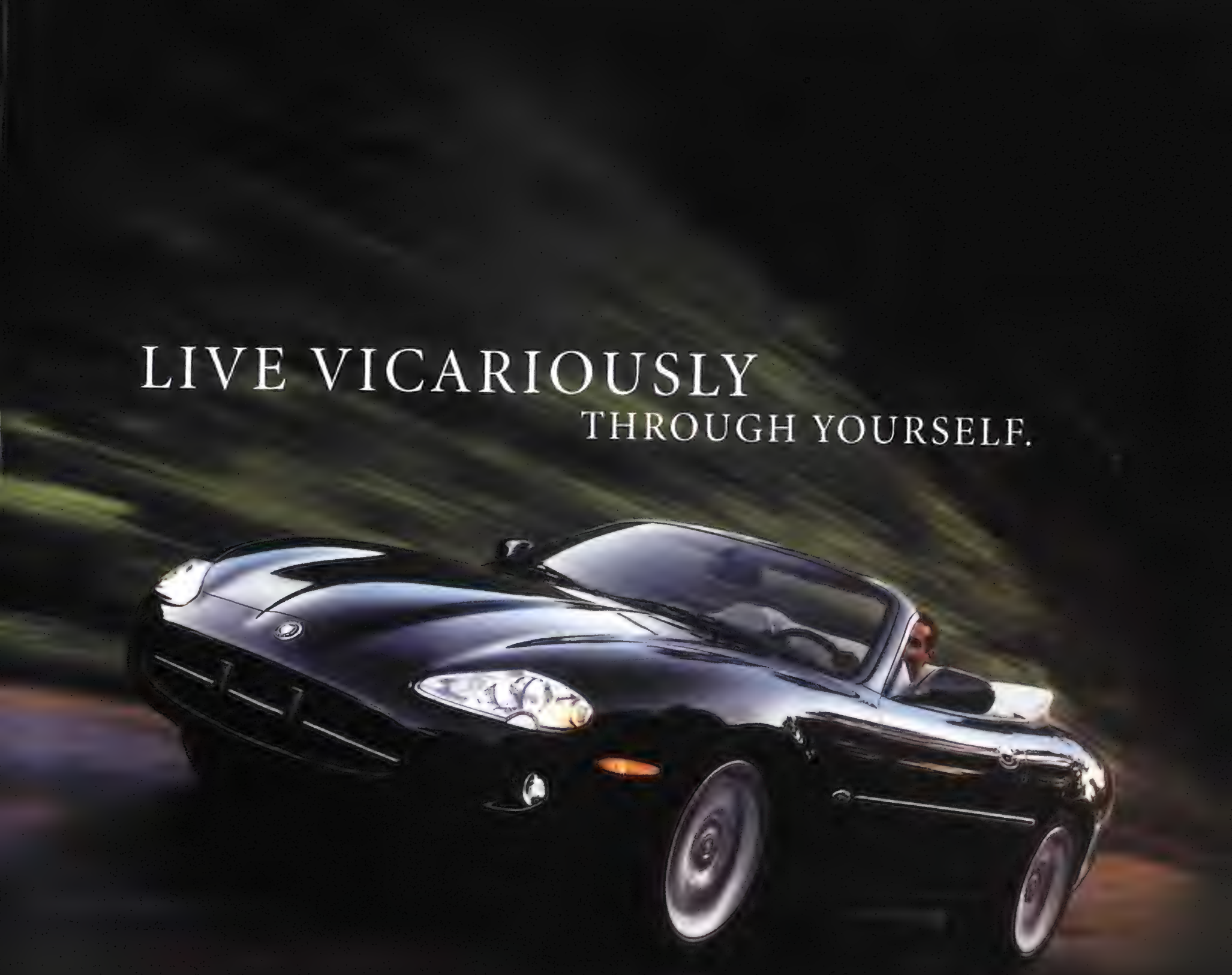
In the narrow canyons and spiky ridges of rugged Northern California, daytime air currents normally move from the warm canyon floor toward the cooler ridgelines. As the sun drops, the flow gradually reverses. That day the evening reversal was sudden—and scary. "It was like someone threw a light switch," Winton said. The normally light down-canyon winds accelerated abruptly to 20 miles per hour. The firefighters suddenly found themselves facing a towering wall of flame.

"I mean, we were sweating," Winton said. "We had to back out of there, quickly. We have a healthy respect for what a fire can do." The wind shift also blew fire across Winton's fire line on the south flank. This "slopover" threatened to swiftly spread down the canyon, jump the creek and overwhelm Manton and the area around it.

Fry had been in his Redding headquarters before daylight. He and his operations chief, Wayne Dunham, could already see that the multiple fires would far outstrip Shasta-Trinity's resources. "This was a job for Superman," he quipped later, noting that the barrage of lightning fires would be piled on top of the other small fires and emergency incidents the district faced every day. At 6:15 A.M., Fry had asked for the CDF equivalent of the Man of Steel. He requested assignment of an Incident Command Team.

When a major fire strikes and threatens to overwhelm local resources, CDF musters a handpicked group of senior officers and local experts. This staff and operations group then takes over the myriad duties of a prolonged, major fight in every way, from hiring private equipment, tracking costs and setting up vehicle repair facilities, to bringing in mobile kitchens to feed high-carbohydrate meals to hundreds of hungry firefighters and assuming front-line command of the firefight. By mid-afternoon, to Fry's joyous welcome, Incident Command Team 4 had assembled and was setting up a small city for an expected 3,000 firefighters at the Shasta District Fairgrounds. Battalion Chief Dick Hayes of Red Bluff arrived to relieve Britton at the Rock Fire.

LIVE VICARIOUSLY
THROUGH YOURSELF.



The new JAGUAR XK8 *contains a 32-valve, 290-horsepower AJ-V8 engine. A cabin crafted from the finest Connolly leather and burl walnut. And an Integrated Navigation System which allows you to choose the only route that really matters. Your own.*

JAGUAR
THE ART *of* PERFORMANCE

Call 1-800-4-JAGUAR or visit www.jaguar.com/us. ©2000 Jaguar Cars.

An Erickson Aircrane loads 2,000 gallons of water from Lake Shasta. This is the largest helicopter the California department uses.

Hayes, a wiry, energetic figure, had already toured the fire's perimeter. Now the chiefs assembled to discuss tactics. Cell phones and radios insistently crackling, they spread out a map on the hood of Hayes' truck. Their first move, they decided, must be to contain and subdue the slopover. Hayes pointed to the opposite side of the map. "We need to build a secondary line right here," he said, his finger tracing a dirt road on the north side of the fire. "Because if it keeps moving in that direction and jumps across the drainage toward Shingletown, we're in deep stuff." He pointed on the map to a spot at the end of the road. "That reservoir gives a good water source.

"We have to hit it hard and heavy tonight," Hayes told the others. "My crews are already on 24-hour shifts," Winton said. To my questioning look, he explained, "By the time you pull them off, drive them back to the base, feed them, shower them and sleep them, you've used up five hours and it's almost time to go back. And they're by no means rested."

Darkness was closing in and so was the smoke layer, putting an end to any aerial assault. Flames were still visible. But night gave the firefighters a secret weapon. "Night is the firefighter's ally," John Watt had told me. "You get the sun off the fire, the air cools, the humidity rises, the wind dies down. You can get your arms around it."

Hayes brought in portable lights. Working by their beams, the lights of the dozers and the lanterns on their helmets, stumbling over fallen trees, fighting mosquitoes and rocky footing, with only an occasional breather or drink, the firefighters attacked the fire along both flanks, pinched off its head and checked its eastward movement. The slopover had been rolled back across Rock Creek Road, and the spot fires beyond it erased. The threat of a spread to the north had been lifted, and the eastward movement had been controlled by 3 A.M. By dawn, Hayes declared that the fire was "60 percent contained" and predicted it would be fully controlled 36 hours later.

"Hundreds of Blazes Sear North State," proclaimed a *Sacramento Bee* headline that day. At 6 A.M., with the sun filtering wanly through the smoke layer that overhung the area and spread 100 miles south, the commanders of all the fires in the Shasta-Trinity unit gathered. Stoked by a sausage, eggs and hash-browns breakfast, they

With multiple fires raging, a chief warned his crews: "Don't expect more help, because there isn't any."

leafed through a 30-page incident action plan (IAP). The Team 4 plans and operations unit had stayed up until 1 A.M. in their makeshift headquarters among the steam tables and sinks of the fairgrounds cafeteria, playing a chess game of where to place their limited resources.

"We Interrupt Your Summer To Finally Bring You A Fire Season," the IAP proclaimed on its cover. Holding the document aloft, plans chief Tom Osipowich, nicknamed Tommy O, told the group, "There's plenty of fire out there for all of us." And, he warned, "What you see here, in terms of resources, is what you get. Don't expect more help, because there isn't any." Because of the smoke generated by the multiple fires and the heavy demands, air attack would be a particular problem. Fire weather forecaster John Snook announced gloomily that the hot, dry, burning conditions and 100-plus temperatures would last at least two more days and that the smoke layer would not lift until afternoon. The firefighters were further reminded that they would face not only flames and smoke but heat exhaustion and rattlesnakes. They didn't need to be reminded of the 14 firefighters who were trapped and killed in the South Canyon fire in Colorado a few years earlier.

At the fire site, yesterday's angry flames had subsided, but that didn't mean the orange monster had capitulated. Hayes had told his troops to mop up, specifically to quell any smoldering areas—"sleeper fires" that might suddenly erupt into flame. Which is why Winton and I found ourselves on a steep hillside off Woodcutters Way, under a 60-foot oak tree. Yesterday's fire had entered the trunk near its base, burned its way upward and was now throwing smoke and sparks out a basketball-size knothole about 20 feet above the ground. Winton's strike force was attempting to smother the hidden fire by forcing foam down the knothole, but with limited success. The tree simply could not be allowed to burn.

"That tree's been around longer than any of us," Winton said. "But I'm afraid it's going to have to come down." He summoned an inmate crew to clear a path for the tree to fall without snagging on other trees, and a chain saw crew to fell it. But before the saws began to whine, there was another sleeper to deal with.

DeAnnis Bailey of Susanville had been perched on her OES engine on "structure protection" beside a hilltop mobile home from which the occupants had fled. She was munching a sandwich when she heard a suspicious noise and sniffed a telltale smell. Bailey turned and saw white smoke, then darker smoke, then flame. While she watched, the flame crowned to the treetops.

Winton was the nearest officer, a half mile away. Alerted by radio, we went roaring up the rocky road in Winton's truck, pausing only to summon an engine and a "fire track," an experimental vehicle whose tractor treads and bulldozer blade make it able to move where engines cannot. Within minutes, we were at the site, a promontory overlooking a scenic canyon and a wooded lake. The fire was small, only ten or so acres, but had potential for real trouble. Winton quickly sized up the sudden fire as a reburn. A reburn, my walking encyclopedia Brian Weatherford explained, occurs when a rapidly moving fire sweeps through at ground level, its intense radiant heat searing but not igniting the foliage above. "Feel," he said, breaking off a leaf and handing it to me. It crumbled at my touch. A shift of wind, or an errant spark, on the baked-out vegetation then ignites a new fire, often over the heads of unwary firefighters.

In this case, they were lucky. Winton immediately radioed for aerial help and was relieved to learn that a leased helicopter had just touched down at the Rock Fire staging area, minutes away. Its reassuring *whup-*

One conservation camp inmate sharpens his tools while another grabs some much-needed rest at the Shasta Dam staging area.

whup was quickly overhead. We watched as the helicopter dipped water from the nearby pond, dropped it on the fire, returned for another 300 gallons and made a second drop. I counted 12 round-trips, by which time Winton had moved in with the fire track and engines and had stopped the reburn.

At the next day's early-morning briefing, Hayes cited the reburn ("we had a scary moment out there yesterday") as a warning to firefighters not to become overconfident. At the same time, he declared that the Rock Fire—which had consumed 700 acres and had cost $1,071,000 in damages—would be fully contained by nightfall.

It was more than two weeks before the Shasta-Trinity lightning fires had been picked off one by one. The men and women of Incident Command Team 4 compiled their final report and went home; so did the hastily mobilized crews from all over the state. Residents of Woodcutters Way moved back. But there were still two months to go in the fire season, and three times Fry's telephone jangled in the night for a major incident.

In the first one, hot, dry, gusty north winds whipped up a savage flash fire in an inhabited woodland community south of Redding and in less than 12 hours had completely destroyed 74 homes and 262 garages, barns and other outbuildings, causing more than $9 million in damages. The ashes were still smoldering when firefighters were sent scrambling eastward to a monumental fire in heavy timber in Tehama County, in an area so rugged and remote that inmate crews had to be airlifted in by helicopter. That fire spread across an area the size of the District of Columbia and, in the words of Tommy O, "could have gone all the way to Disneyland" if it had not been checked by setting a series of backfires. Finally, just as the calendar insisted that the fire threat would be over in a few days, "we had the eighth worst fire in the state's history," Fry said ruefully. The Jones Fire, pushed by 60 mph winds, had Fry and the Redding fire chief drafting plans to evacuate the city of 78,000, and fire engines racing from as far south as Bakersfield with lights flashing and sirens screaming.

Before it was subdued, the fire had forced the mobilization of 416 engines, 58 bulldozers, 48 inmate crews, 35 water tenders and 2,633 firefighters. A record 240,000 gallons of retardant had been dropped. When Fry collapsed into bed on the first blessed rainy night of November, CDF had exceeded its $62 million emergency budget by $30 million.

Three daughters and a couple of friends help the Ray family look for missing jewelry in the rubble of their home in Happy Valley.

Edwin Kiester, Jr., now bears a fire scar on one ear. Ed Kashi is working on a personal project titled "Aging in America."

A juice so smooth
the greens will be jealous.
©2000 Tropicana Products, Inc.
Tropicana
PURE PREMIUM
RUBY RED
GRAPEFRUIT
Tropicana Pure Premium Ruby Red Grapefruit Juice.
Great taste and powerful nutrition are par for the course.
The best 9.3 seconds you could possibly spend on yourself. Everyday.

Capturing AMERICA'S *Fight for Freedom*

BY LUCINDA MOORE

SMITHSONIAN EXPERTS HELP THE MAKERS OF MEL GIBSON'S NEW MOVIE, *THE PATRIOT*, CREATE CREDIBLE REVOLUTIONARY WAR SCENES AND BRING THE CONFLICT'S MANY FACTIONS INTO SHARPER FOCUS

Smithsonian expert Rex Ellis chats with Mel Gibson while serving as adviser on the Gullah village set he conceived for *The Patriot*.

AS THE SUN SINKS BENEATH THE DARKENING SOUTH Carolina sky, enemy armies camped on distant fields fade into shadow. Their threatening numbers hover heavy as fog in the minds of commanders in the opposing camp, who grope for a way to defeat them. One officer laments the militia cannot hold its lines. Around him, wounded soldiers wrapped in blood-stained bandages lie on operating tables lit by lanterns and fires.

A plane soars overhead.

"Cut!" utters director Roland Emmerich—softly, patiently, as though night were not fast approaching.

A buzz of conversation erupts as cast and crew on the set of *The Patriot*, the new Revolutionary War film starring Mel Gibson, bustle about, joking, stretching, closing their jackets against the chilly evening air.

Gibson plays Benjamin Martin, a fictional character based in part on South Carolina militiaman Francis Marion, called the Swamp Fox for his cunning use of guerrilla warfare against the British. In this scene he tells Colonel Burwell and others that the undertrained militia can be used effectively.

Emmerich attempts another take. An extra stumbles into the shot. "Cut!" Still patient, he tries once more. "And—that's a wrap!"

Crew members surprise Emmerich with a book containing images of skyscrapers. It's a birthday present. He leafs through the book, looking at pictures of buildings depicted in some of the other films he has made: *Godzilla*, *Independence Day*. "In those movies we blew everything up; in this one we burn everything down," he says, comparing his sci-fi films with this period piece, in which British soldiers set fire to several buildings, including houses.

Special effects aside, Emmerich and the staff of Centropolis Entertainment, his production company, have gone to great lengths to create authenticity in the film. Long before production began, they enlisted the help of several departments at the Smithsonian's National Museum of American History (NMAH) to advise on uniforms, weapons, battle formations, furniture and more.

Consultations with museum experts resulted in numer

ous revisions to the script. "I did have quite a few meetings with Rex Ellis [chairman of NMAH's cultural history division] and others," says Emmerich, revealing a slight German accent. "We went page by page through the script. After every new script version, we got long notes from the Smithsonian."

Recommendations from Ellis, in fact, resulted in the creation of an entirely new set. When the filmmakers sought a place where Martin's family could hide from Britain's villainous dragoons, Ellis suggested the British would never know to look in Gullah maroon villages—hidden communities established by runaway slaves. The screenwriter, Robert Rodat, author of *Saving Private Ryan*, worked closely with Ellis to weave this unique setting into the script.

"Every relevant department at our production company met with the Smithsonian," says Dean Devlin, a partner and producer at Centropolis (the film is coproduced by Mutual Film Company and Centropolis Entertainment, and financed by Columbia Pictures, a division of Sony). When members of the Centropolis art department visited NMAH to view collections, they wanted to know everything from the size of British and American troop formations to the ranges of muskets and rifles, to the table settings and cooking utensils one would see at a plantation, a farm and a Gullah village.

Ellis showed them images of wattle-and-daub huts. Uniforms expert Marko Zlatich showed them George Washington's uniform, among others, plus the general's tent and trunk. Weapons expert Sarah Rittgers demonstrated how soldiers made lead bullets in their spare time. The questions, however, did not end there.

In the offices of Lee Woodman and Meredith Morris, at Smithsonian Entertainment (the department that brought the makers of *The Patriot* and the museum experts together), I have gone through a four-inch-thick file of queries and responses between the filmmakers and the curators on questions that arose after the tour. "Our goal," relates executive producer Lee Woodman, "is to look for ways to deliver our resources to new audiences through commercial media, and that includes feature film, television, live theater, radio."

Indeed, experts from the museum delivered data on a wide range of topics—closets as we know them did not exist in 18th-century American houses; it did not snow at the Battle of Monmouth (originally in the script) because the clash occurred in June; British soldiers should address their general as "My Lord"; Britain's Green Dragoons were made up mainly of American loyalists, so making Martin's neighbor one would show the war's divisiveness; Charleston fell in May 1780, only then it was called Charles Town.

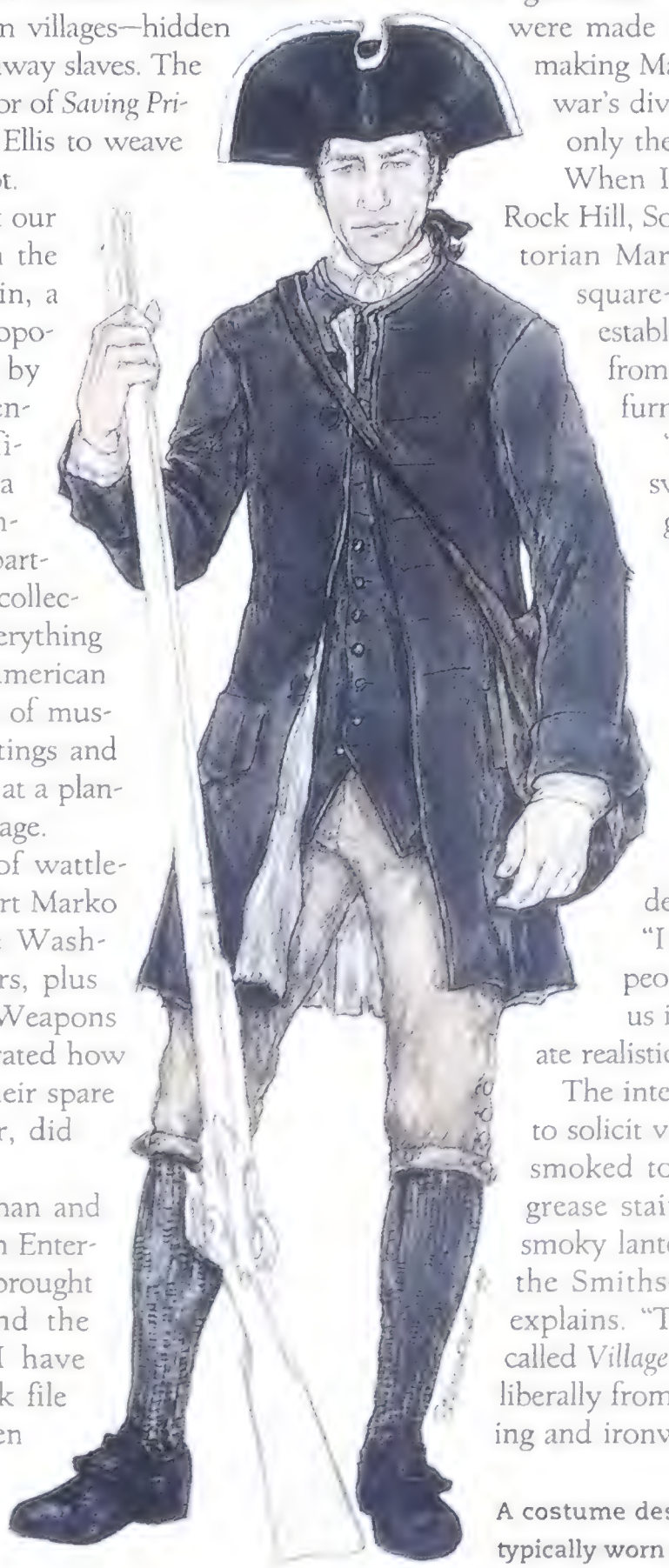
When I went to the shooting location near Rock Hill, South Carolina, along with NMAH historian Margaret Vining, we visited a 54,000-square-foot workshop the filmmakers had established in an old mill a few miles away from the set. Workers were making period furniture, Gullah huts and—tree trunks?

"Hurricane Hugo wiped out the huge swamp cypresses," explains Mary Morgan, location manager for the film. "We must re-create them and add aging and definition after producing the cast. Then we'll hang Spanish moss from the towering trunks, and they will be reflected in pools of black tar water along with the real cypresses in the swamp."

I spot fabricated sides for the wattle-and-daub-styled huts that Ellis described, and piles of thatched roofs.

"I have a picture window into other people's lives," says Morgan as she leads us into a tavern, "because I have to re-create realistic images of other times and places."

The interior of the tavern (where Martin goes to solicit volunteers for the war effort) has been smoked to make it look authentic. There are grease stains above the stove, dingy curtains, smoky lanterns. "The tavern came directly from the Smithsonian," set decorator Victor Zolfo explains. "There's a reproduction of a painting called *Village Tavern* on exhibit there, and we stole liberally from that, and also from a lot of the lighting and ironware we saw.



LOIS D'ARMOND

A costume designer's sketch shows the civilian attire typically worn by militiamen called to service.

A Gullah maroon (or runaway slave) village, where Gibson's movie family hides, features wattle-and-daub huts with thatched roofs.

"Our battlefield dressing, the encampments, including the British versus the American setup, tents, ammunition boxes, all came from our visit. A lot of pieces we shot there and duplicated from photographs—Colonel Burwell's tent (Burwell is a fictional character based loosely on Light-Horse Harry Lee), George Washington's campaign furniture. You'll see when you get to the battlefield."

At the main set, the battlefield is, appropriately, on an 800-acre cattle ranch the studio has leased. The 1781 Battle of Cowpens, which inspired the scenes shot here, helped turn the tide of the war and was named for the cow-pastures-turned-war-grounds on which the battle was fought.

I ask producer Dean Devlin how working on a period piece compares with creating the sci-fi movies he and Emmerich have made. "It was a different discipline, a different level. Thanks to the Smithsonian, we were able to get a lot of things into the picture that weren't in the script when we first read it. I wasn't aware that the American Revolution was fought with a racially integrated army, and that it was the last time we had one until the Korean War."

A loud explosion pierces the air, shaking the ground beneath us. "I near jumped out of my skin!" Mel Gibson exclaims as he returns from shooting a scene. "I forgot those things were going off!"

As smoke from the cannon hovers over the field, I wonder whether the filmmakers attempt to control the amount released. "Every single thing you see on that screen is controlled," production designer Kirk Petruccelli assures me. "They test that earlier—how far the flame and the smoke should shoot out. We built cannons that fire real charge, and we calibrate how much to use to get a realistic amount of smoke. They'll put a digital cannonball in there later and integrate it into the movie."

During a break, I chat with Gibson about his penchant for historical war themes. He proved his mettle for the subject when he took home two Oscars for the 1995 film *Braveheart*, a 13th-century drama he directed, produced and starred in about real-life Scotsman William Wallace. In the movie, Wallace was a reluctant hero, unwilling to be drawn into the fight against the British soldiers occupying his homeland until they killed his wife. The situation is not too unlike that of the character he plays in *The Patriot*. Martin also gets drawn, reluctantly, into America's conflict with the British, who occupy parts of South Carolina, wreaking havoc upon its citizenry.

"I always enjoy history and find it compelling—the excitement of battle—but the idea of armed conflict between human beings terrifies me," Gibson admits. "It's an area that I want to explore without getting bloody," he adds, as we climb into the van transporting him around the set.

"They can bore you to death, those big epic themes," he says. "They're no good unless you have a real human story inside them, which is what is good about this film."

He refers to the conflict between Martin and his son, Gabriel, played by Australian heartthrob Heath Ledger.

"This is called *The Patriot*, but Martin's not really the patriot; he hasn't got the wider view of things," Gibson says. "His son is actually the patriot, the one that understands the whole conflict and what they stand to gain from it. Martin just goes along to watch his son's back."

Asked how he learned to handle muskets and make lead bullets, he explains, "Martin makes them in the movie. I got here a month early and just went into training. I know the Smithsonian helped out, some of their departments, quite a bit. And I thank them for that."

The van careens in and out of the deep potholes that

vicky hart/mezzo-soprano

valery ryvkin/conductor

vicky: the arts is not the most stable career. then, when you have a child, the uncertainty really hits home.

but little by little leila's taught us how to balance this sometimes precarious life in the arts with the need for long-term financial well-being. she took the time to find out who we are...what's important to us...

we couldn't be doing this if we thought we were compromising amanda's future.

"amanda's needs are not negotiable"

Individuals appearing are actual Merrill Lynch customers and were compensated.
©2000 Merrill Lynch, Pierce, Fenner & Smith Incorporated. Member SIPC.

leila ross/financial consultant

leila: vicky's instincts were to put their assets in a nice safe place...t-bills and cds.

we took a hard look at what they really needed—immediate and long term—and put together a plan. eventually, we created a portfolio designed not only for growth but also for a steady income so vicky could devote herself full-time to her singing.

then amanda came along, which gave a whole new meaning to "long-term investing."

be bullish **Merrill Lynch**

riddle the dirt roads on this massive farm. Soon we reach a lot filled with rows of trailers. Nearby are tents for make-up and wardrobe, and training grounds for extras playing soldiers. We resume talking inside a large trailer reserved for Gibson. I ask what else he did to prepare for the role.

"I watched the PBS series on the Revolution and read books. I learned a lot because I had a general sense of the whole conflict—but to actually get down to tin tacks, how it laid itself out, the different factions involved—the complexity was a surprise to me.

"Some of the most brutal conflicts in the South here were between people who lived in America—people who wanted to revolt and those who didn't. I mean, there were bloodbaths going on! They had no sense of themselves as a nation then.

"I find it extremely interesting to go back and imagine what it must've been like," he adds. "You'll get more accurate readings about what's going on in the world today by reading about what happened in ancient Greece than by reading the newspaper."

Inadvertently I raise an eyebrow.

"Because history does just stumble over and repeat itself," he explains. "Did you ever read Thucydides?" he says, his face lighting up.

"He was like a roving reporter in the Peloponnesian War, going from side to side reporting, around 400 B.C. It's amazing this stuff survived! It was completely unbiased, and people didn't cover up as much as today. It's just one big cycle, and the same forces are at work all the time. I'm pretty cynical about the powers that be," he concludes.

Weapons expert Sarah Rittgers, who holds a powder horn here, showed filmmakers how to make lead bullets.

As Gibson gears up for the next shoot, I mention that Martin wields a pretty lethal tomahawk in this movie and ask if revenge plays a part in the character's motivation.

"There's definitely a revenge angle going," he concedes, "but I think it's fear, and that's the way I'm approaching it. Martin's got a very violent past. He admits he stepped over the line as far as atrocity and savagery went in the French and Indian Wars, and he's waiting for it to come back and bite him on the posterior. And it starts to do that. It's like this terrible Greek tragedy almost—he tries to avoid the conflict for fear of what he might lose—and he finds that he's losing it anyway. So he's goaded into the war."

En route to the Patriot encampment, where shooting resumes, the farm appears a vast ocean of earth, sprayed in sunlight—a succession of hills and valleys gently rising and falling as far as the eye can see. The director lines soldiers against the horizon miles away, spreads them across lowlands and hides them behind ridges. I ask how many soldiers ultimately will be depicted on-screen.

"The actual numbers on the field," Emmerich says, "are over 600. Later you'll see maybe 3,500, digitally multiplied, and that's better. Some Russian films had thousands on the field, but when you get more than 500 extras, it gets pretty uncontrollable."

I pass hundreds of tents set up by reenactors (people who stage authentic period battles for fun), hired here as extras for the battle scenes. Even after the cameras stop rolling, they remain true to the times and sleep in tents the way real soldiers did in the late 18th century. One reenactor expresses concern over the color of the uniforms worn by the Green Dragoons. "The coats were green," he tells me. Although advised of this, moviemakers decided to make them mostly red to ensure that audiences understood the affiliation with the British redcoats.

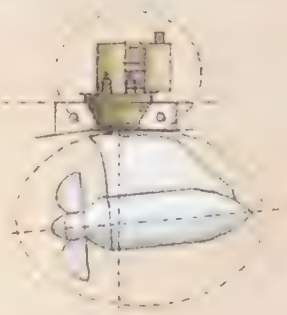
Here and there, compromises were made. Furthermore, according to producer Lee Woodman at Smithsonian Entertainment, "Smithsonian was not the only word." Experts at the Smithsonian and elsewhere, for instance, disagreed over whether the American flag shown in the movie actually existed at the time, but agreed that it would not have been used in battle. Filmmakers carefully considered all of the research and decided to use the design, with its stripes and circle of stars—and to display it in battle, despite the historical inaccuracy—because it would be recognizable and meaningful to general movie audiences.

Historian Margaret Vining wishes that women could have been better represented in the film. "Women were

WORLD'S FIRST ALL-SUITE, ALL-BALCONY SHIP SPOTTED OFF THE COAST OF ALASKA:

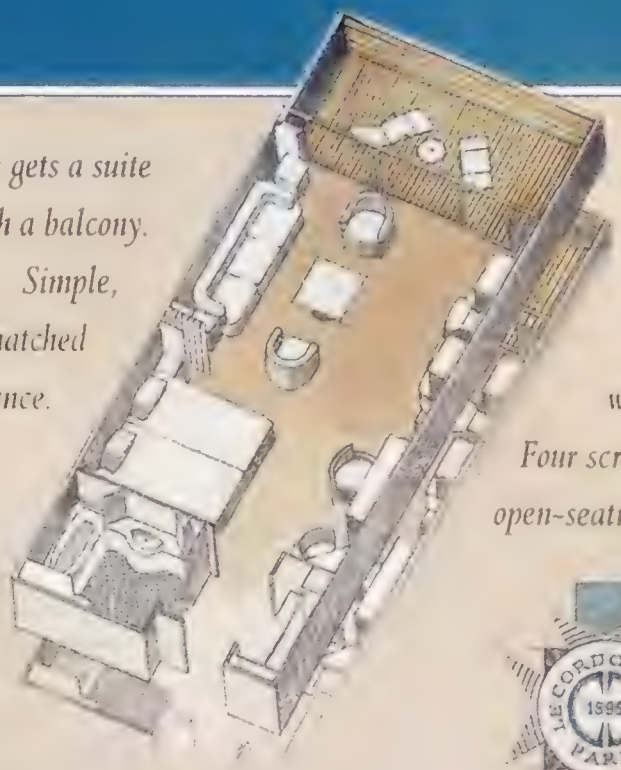
*Totus-balconus navis**

Quieter and virtually vibration-free Azipod propulsion system.

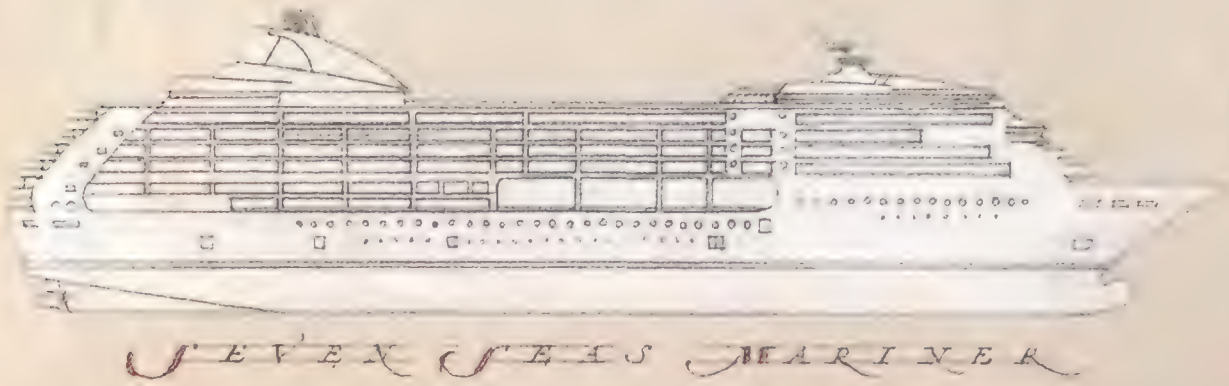


Acclaimed Judith Jackson collection of soothing spa therapies and treatments.

Everybody gets a suite with a balcony. Simple, unmatched elegance.



Select sailings offer culinary workshops. Four scrumptious open-seating options.



Look — walk-in closets. Space. The final frontier.

You don't have to speak Latin to recognize a rare breed. The world's first and only all-suite, *all-balcony ship, Seven Seas Mariner is proud to offer the highest space-per-guest ratio on the seas today. Each of her 700 guests will be treated to the utmost in personalized, six-star service. From pampering the body in our Judith Jackson Spa, to pampering the palate with our exclusive Cordon Bleu cuisine, 24 hour room service, open seating in four extraordinary dining venues and complimentary fine wines with dinner. It is traits like these, along with shore-intensive itineraries and a gracious no-tipping policy that make Seven Seas Mariner a rare discovery indeed.

RADISSON SEVEN SEAS
CRUISES

Seven Seas Mariner's inaugural 2001 season features voyages to Panama Canal/ Costa Rica, Alaska, the Mexican Riviera, the Caribbean and the South Pacific.
For details, consult your travel professional, 800.424.3964 or rssc.com

Ship's registry: France

SEVEN SEAS MARINER ¤ SONG OF FLOWER ¤ PAUL GAUGUIN ¤ SEVEN SEAS NAVIGATOR ¤ RADISSON DIAMOND

very, very much involved in armies and military institutions at that time," she says. "You would see them in camp, there as wives and cooks, as part of army support."

When Rex Ellis goes to South Carolina to advise on the Gullah village set, I observe firsthand. I pass huge cypress trees that line the road—their long, twisted arms interlocking overhead across the highway. Water-soaked moss droops eerily from other trees.

Cameramen are shooting in a rather cramped tent, filming Martin and his children asleep inside a Gullah hut. They roll wind sound effects while someone shakes the structure, making it sway and creak as if during a storm.

A mischievous smile slowly curls Gibson's lips, and others on the set burst out laughing. "I knew he'd do something like that," Emmerich says, smiling too. "OK, once more."

Gibson stays asleep through two more takes. It's a wrap.

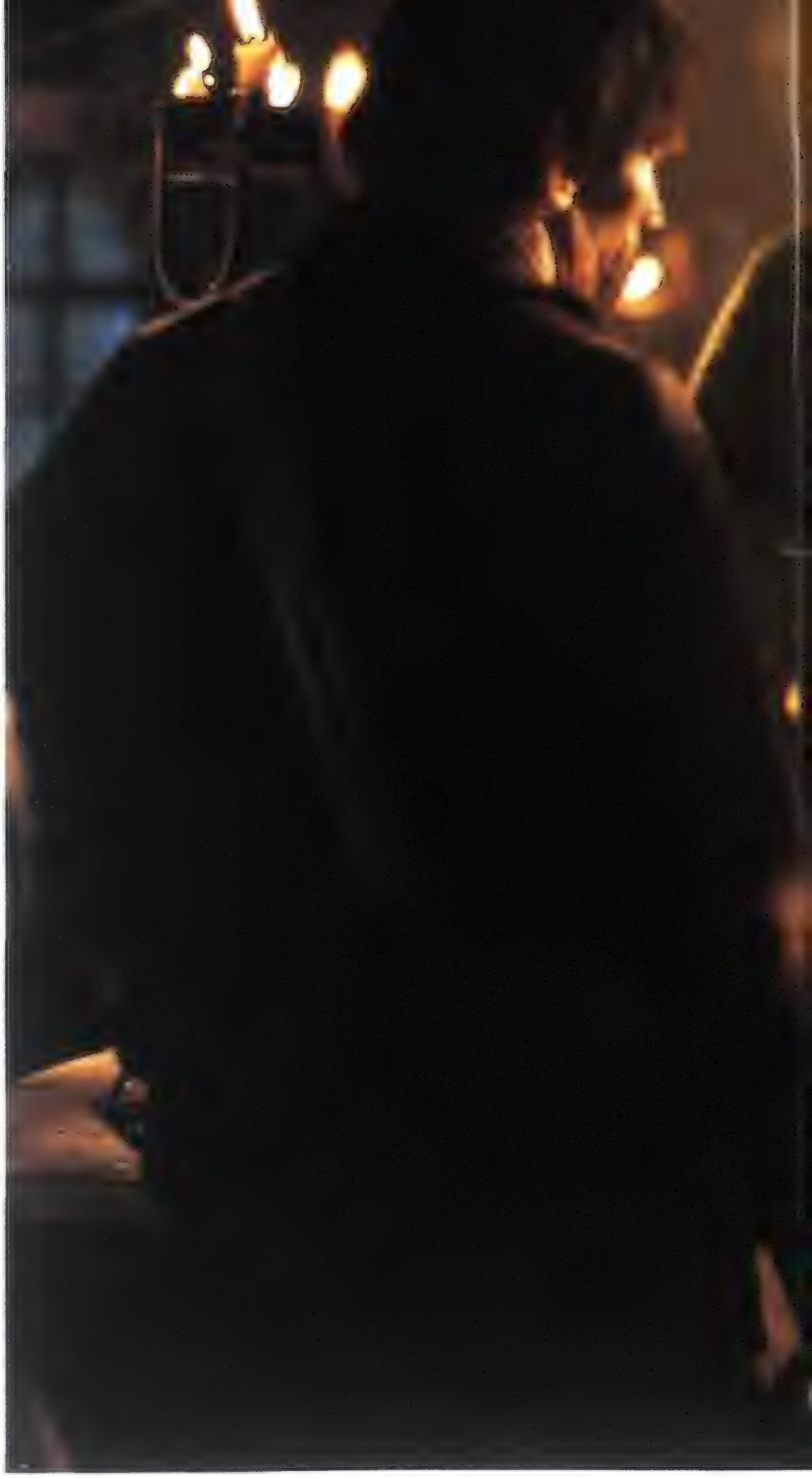
I seek out Ellis to get some historical context for what we are about to see in the village. "This community," he says, "is a microcosm of the black community that gathers people from Angola, the Congo, the Ivory Coast—people from various areas. And the Gullah language—a patois combining elements of their native tongues—is the common, central piece that allows them to coexist.

"Maroon communities were illegal villages that were set up by runaways who were trying to find an isolated location. This is one of the ironies of where we're shooting this," he says. "The water was the interstate highway of the 18th century, out there for all to see. They would not have been there. It's a beautiful shot, but it's not in the interior, not even in the woods, which is where this kind of community would've normally been."

Overall, Ellis thinks the filmmakers have been very responsible. "There are some things they decided because they wanted to retain part of the story. I wish they'd had a garden somewhere because it was such an integral part of the community. But things they could change—when I got here yesterday, for instance, they had animal skins turned around with the fur facing the sun. Well, the sun's not drying the furs, it's drying the hides, so we turned them around. They didn't have any females with baskets on their heads. The concept of basket-toting was very, very popular. So they got Marquetta Goodwine, the Gullah heritage expert on the set (whose group is performing some of the music), who said, 'Yes, I can do that,' and one of the youngsters walked around with one as well."

The scene at the Gullah village is of thatched-roof huts, men on horseback and women in African head wraps along a narrow strip of land bordered by a wooded swamp, a tidal pool filled with docked canoes, and the Atlantic crashing and foaming behind them.

"I added the song the boatmen are singing in the water when they come onto the island," Ellis says. "It may end up on the cutting room floor, but they'd be interacting with each other and they'd do that through song."



Gibson, as Benjamin Martin, recruits militiamen in Boar's Head Tavern, a set modeled after an image at the Smithsonian.

It is a cold, damp, blustery day. Shirtless young men, goose pimples visible, pull wagons and carry baskets as Gabriel (Martin's son) brings his aunt Charlotte and his siblings to safe haven.

I ask about guns on the set. "It's unrealistic to think that slaves, especially runaways, did not have access to guns," Ellis says. "A maroon community could not have existed if they could not have protected themselves. What better

SONY PICTURES/COLUMBIA PICTURES

time to show guns in the village than when these white strangers arrive? So we added guns.

"There should've been scars on the backs of these former slaves," he says. "The filmmakers agreed to it, but makeup couldn't authenticate those images in two days."

When I run into Jay Arlen Jones, who plays Occam, a slave who fights alongside Martin, I get his take on the movie. "Occam is the moral eye of the story," he says. "When Martin comes to recruit militiamen in a tavern, I'm there with my master who doesn't want to get involved in the war, so Martin gets me in his place. When I've ridden with them for a year, I've earned my freedom. We're at a battle and we're outnumbered. I'm reminded I don't have to stay, but I choose to stay and fight."

I ask why he thinks Occam decides to stay.

"He wants to create a change," he says, "so his mother, sisters and brothers aren't chastised anymore for having a different color of skin."

Indeed, the refrain of freedom that resounded throughout the Revolutionary era raised the hopes of many slaves that the war might provide the key to unlock their shackles. Little did they know that for millions of slaves in America, freedom would take nearly another century—and even then it came only in degrees.

I ask Ellis about the accuracy of individual slaves gaining freedom as Occam did. "At some point Lord Dunmore, the British governor of Virginia, offered freedom to slaves who joined him, but unlike in the movie, George Washington and the Continental Congress never formally did," concedes Ellis. "There is evidence some blacks were required to serve in their master's stead," he says. "And masters could offer freedom to individual slaves who fought. There's a book, *The Black Presence in the Era of the American Revolution*, that talks of blacks by name who fought for the Patriot side. A number of those soldiers were given land in Ohio Territory, then Virginia. The same happened on the British side with some blacks who were promised their freedom and given land afterward in Nova Scotia in Canada." Thousands of black soldiers who served on both sides of the war, however, were returned to bondage.

The wind is so fierce today that I finally take refuge behind one of the huts to shield myself. Emmerich admits his biggest challenge has been "fighting every day with the problem of light, sun, the weather."

I watch as Gibson and others repeat a scene where Martin is reunited with his family for the first time since having joined the war. He rides briskly into the village, stops the horse on a dime, jumps down and hugs his children, over and over, while Emmerich has this filmed from every conceivable angle. Finally, Emmerich gets the shot he wants and calls it a day.

As the cast and crew make their way down the swamp-lined exit, I chat with Emmerich about how his consultations with Smithsonian experts have gone. "Oh, on certain kinds of points," he says, "we had to decide what is more important, historical accuracy or the dramatic impact, the dramatic license you need sometimes in a story like this." He pauses, reflecting on the collaboration, then adds, "It was a pretty good duo."

Associate Editor Lucinda Moore says observing work on The Patriot *has inspired her to finish her screenplay-in-progress.*

THE NISSAN MAXIMA. *There is a heaven on earth. And to access its pearly gates, all you need to do is open the sculpted metal door handle of the Nissan Maxima. Once inside, you'll hardly notice the bumps and potholes outside. What you will notice is a fine grade of sumptuous leather appointments. Outside, horns will blare, jackhammers will clamor, the wind will howl. Inside all falls nearly silent. Except when you summon the sounds that are available to you from a 7-speaker Bose® CD audio system. Yes, outside it's a veritable inferno. But inside the Maxima, you'll reside in its polar (albeit climate-controlled) opposite. And with "one of the ten best engines®" underfoot, suffice it to say, you can quickly catapult to your next destination. A place called Nirvana. Inquiries? Call: 800-235-8880. Or click: NissanDriven.com. The Nissan Maxima:* **CARS LIKE IT: 0**

Maxima GLE shown. *2000 *Ward's AutoWorld*. Bose® is a registered trademark of the Bose Corporation. Nissan, the Nissan Logo, DRIVEN and Maxima are Nissan trademarks. ©2000 Nissan North America, Inc.

SQ. FT. OF LEATHER: 45

LBS. OF SOUND INSULATION: 64

CU. FT. OF HEAVEN: 102

NISSAN

DRIVEN.

The Poetic Vision of Spanish Sculptor

Eduardo Chillida

A metaphor for man's connection to nature and an homage to the wind and sea, Chillida's sculpture *Peine del Viento (Wind Combs)* has been a celebrated fixture on the city of San Sebastian's rocky coast since 1977.

Chillida, above with his wife, "Pili," converted an old Basque *caserío*, or farmhouse (top), into a dynamic sculptural space to showcase his work.

BY STANLEY MEISLER

EDUARDO CHILLIDA, THE RENOWNED 76-YEAR-OLD SPANISH sculptor, wants to climax a long and distinguished career by carving out a massive space 11 stories high and just as wide inside a mountain on one of Spain's Canary Islands in the Atlantic Ocean. The tall and soft-spoken Chillida, who often sounds more like a poet than a sculptor, is awed by the idea of standing within the enormous emptiness of a mountain and looking upward at shafts of light from the sun and the moon.

Chillida (pronounced Chee-YEE-dah) may never realize the work. Although the provincial government of the Canary Islands has approved the project, and promoters are already urging tourists to visit the anointed mountain, a small group of environmentalists has denounced the venture, castigating Chillida for meddling with nature. On top of this, engineers have not yet finished a study to determine whether Chillida's plan is structurally sound, and other problems have arisen. Whether successful or not, the grand ambition of the mountain project has not surprised anyone who knows the work of Chillida well. The artist, who has created both monumental and smaller pieces out of iron and steel and wood and alabaster and cement and clay and paper and stone and plaster, has come to look on space itself as material to mold. To sculpt an immense, mind-boggling space inside a mountain makes artistic sense to him.

After his return, the young Chillida quickly impressed San Sebastian, but not as an artist.

Although Chillida's sculptures can be seen in a number of major museums in the United States, his name—unlike that of earlier Spanish artists like Pablo Picasso and Joan Miró—is unfamiliar to most Americans who do not specialize in art. But his artistry has long been celebrated elsewhere.

Chillida was one of the first sculptors chosen when the Japan Art Association in 1989 began awarding its annual Imperial Prizes of 15 million yen each (around $135,000) to the leading achievers in fields not covered by the Nobel Prizes. The award put Chillida onto an august list of fellow prizewinners that now includes American sculptors Richard Serra and George Segal, American painters Willem de Kooning and Jasper Johns, French painter Balthus and British painter David Hockney.

When the Frank Gehry-designed Guggenheim Museum in Bilbao, Spain, opened a comprehensive retrospective of Chillida's work last year, Kosme de Barañano, curator of the exhibition, told a news conference that Chillida "was one of the three pillars of sculpture in the 20th century." He identified the other two as Constantin Brancusi of Romania and Alberto Giacometti of Switzerland, putting Chillida in exalted company.

The gentle Chillida wears such praise without flamboyance or pretensions. He lives in the city where he was born—the lovely Basque seaside town of San Sebastian in northern Spain. He and his wife, Pilar ("Pili"), will celebrate their 50th wedding anniversary this year. The couple, who have eight children and 25 grandchildren, live in a four-story house high on a hill that overlooks the center of San Sebastian and its bay. Three children and their families live with them. From the large windows of the living room, they can look down on Chillida's most celebrated sculpture, *Peine del Viento (Wind Combs)*. The living room and hallways have a good number of Chillida drawings and sculptures, but more prominently displayed are paintings and drawings by Joan Miró, Alexander Calder, Marc Chagall and Georges Braque, almost all dedicated affectionately by the artists to Eduardo and Pili.

There is a story behind each of the dedications. When Chillida was a young artist in Paris, Braque asked to buy one of his sculptures. Chillida was so thrilled by this attention from one of the masters of modern art that he decided to give the piece to Braque as a gift. But the dealer Aimé Maeght interceded. "Don't be a fool," he said. "This is the first time Braque has offered to pay for anything." So Chillida compromised and agreed to exchange his sculpture for a painting by Braque. The painting is unusual, for it is not Cubist but representational—a portrait of birds. "He loved birds," explains Chillida.

The sculptor, who has tufts of gray hair curling over the fringe of his baldness, has a quiet way of expressing profound thoughts in simple words. "I am always trying to do what I don't know how to do," he says, pointing to one of his recent sculptures. He expressed the same thought at the news conference opening his retrospective at the Guggenheim in Bilbao, adding to the Spanish reporters: "That may sound like a joke. But it's not." He obviously prefers to explore new pathways rather than duplicate his own work.

Eduardo and Pili Chillida are Basques, an ethnic group in the north that regards itself as distinct from the other peoples of Spain. Much of Chillida's work is rooted in Basque culture, and he sometimes titles his sculptures in Euskera, the Basque language. But he refuses to support extreme Basque nationalist causes like independence.

Chillida was born on January 10, 1924, the son of an army officer and an amateur singer. The boy missed the searing experience of most Spaniards of his age, for his family sent him to a friend's home in France during the Spanish Civil War of the 1930s. After his return, the young Chillida quickly impressed San Sebastian, but not as an artist. He made his mark instead as the goalie for the local professional soccer team. But a blow to his knee during a pileup at the goal cut his sports career short. "They totally broke my knee, and I was finished forever," he recalled recently with a grin. "So I began to look in other directions."

THE DAWN OF CHILLIDA

EVEN DURING HIS TIME AS A SOCCER PLAYER, CHILLIDA did not neglect his penchant for art. He was always sketching, making numerous drawings of his colleagues playing cards or relaxing in the locker room. But he did not think much of this youthful output. When he and Pili married, he asked her to burn all those drawings. The new bride complied. "I should not have listened to him," she now says.

Chillida studied architecture in Madrid but soon shifted to drawing and sculpture, and in 1947 at age 23, like so many Spanish artists before him, left for Paris. He married his teenage sweetheart, Pili Belzunce, in 1950, and they set up home outside Paris.

In France, Chillida worked in plaster and stone. A critic, seeing several of his pieces in a show, wrote that the world was witnessing "the dawn of Chillida." But Chillida felt troubled. He had modeled his work after the magnificent Greek marble sculptures that he had seen in the Louvre. "Suddenly, it became clear to me that I did not belong to the white light of Greece," he told a Spanish interviewer recently. "I was lost because I belong to a land with dark light. The Atlantic is dark, the Mediterranean is

PP. 56,57 OSAMU MURAI/CONTEMPORARY SCULPTURE CENTER, TOKYO

The sculpture garden of Chillida's renovated farmhouse/future museum boasts such works as his 1997 *Searching for Light I*, with its three 25-foot-high undulating shafts of steel, and *Tolerance* (below), an early version (1985) of his much larger sculpture for Seville.

not." The sculptor and his wife returned to Spain in 1951 and settled in San Sebastian.

There Chillida searched for a material that would fit the Basque mood. Iron was an obvious candidate. It has been mined from the Pyrenees for centuries. Spinners of legend, in fact, insist that the first Basque blacksmith emerged in 3000 B.C. Chillida happened upon a blacksmith's forge in a village outside San Sebastian and pondered whether iron was the material he sought. "When we entered the forge," he recalled, "it became clear to me that I was right. Everything was black. There I discovered iron."

For a decade, Chillida worked almost exclusively in that material, sometimes twisting his pieces out of old farm tools. He attracted a good deal of attention, winning several international prizes for his work and selling one of his early pieces to Chagall. In 1954, Maeght, one of France's best-known dealers, offered to sell Chillida's sculptures. Thus Chillida became the youngest of Maeght's remarkable roster—one that included Bonnard, Miró, Chagall, Giacometti, Calder, Braque and Léger. From then on, his reputation and earnings would be secure.

To increase sales, Maeght urged Chillida to make molds for casting in bronze so that he could create several identical pieces. Chillida reluctantly gave in, turned out several works in bronze, and then stopped. "Pili," he complained to his wife, "it's like making pairs of shoes." Maeght warned him that there would not be enough pieces for gallery shows if he did not duplicate in bronze. "You are young," Maeght said. "All the artists do this." But Chillida remained stubborn. As a result, all but a handful of his sculptures are unique.

A REBELLION AGAINST GRAVITY

AFTER IRON, CHILLIDA TRIED HIS HAND AT OTHER MATERIALS, primarily steel, wood and marble. As his metal pieces increased in size, he had to shift his work site from a blacksmith's forge to a foundry. He called his massive pieces "a rebellion against gravity." In the late 1950s, he was championed in the United States by James Johnson Sweeney, director of the Houston Museum of Fine Arts, who hailed the Spaniard as "the foremost sculptor of his generation." Chillida's monumental *Abesti Gogora V* (*Rough Chant V*), a 19-foot-wide granite sculpture that looks like a thunderous rush of falling dominoes, was unveiled in the garden of the Houston museum in 1966.

Experimenting continually, Chillida began creating what he calls "gravitations," multi-shaped papers that hang from strings and fall against each other in a kind of collage. But unlike collages, they are not pasted together. "If you pasted them," Chillida told me as he displayed one of his favorites, "you would lose the space between the papers."

JESUS URIARTE, F. CATALÁ-ROCA/TASENDE GALLERY, LOS ANGELES

In the 1960s, Chillida started working with alabaster, a translucent material that allows light to enter and diffuse through the space carved within. This took him far from the darkness of the forge and foundry where he hammered out metal sculptures. But the diffused light still kept him to his Basque roots, for it reminded him of the hazy light that broke through the fog on a rainy Atlantic day.

One alabaster piece, *Mendi Huts* (*Empty Mountain*), in which shafts of light enter the solidity through rectangular "windows," inspired Chillida to conceive of someday doing much the same with a real mountain. The piece normally sits on a coffee table beneath a Miró painting in Chillida's living room. For almost a year, however, it was away, part of the 1999 retrospectives that honored the sculptor at the Queen Sofía National Center of Art in Madrid and the Guggenheim in Bilbao.

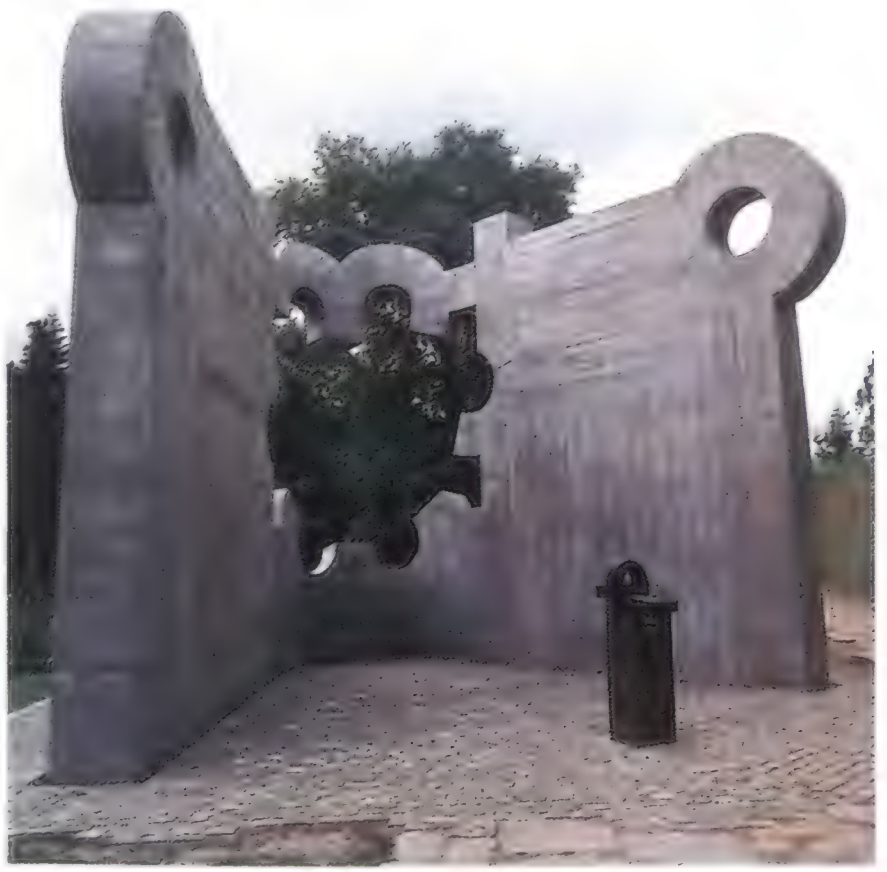
AN AVANT-GARDE SCULPTURE GARDEN

CHILLIDA WAS NOT ALWAYS SO HONORED IN HIS OWN COUNTRY. The fascist government of Francisco Franco, which ruled Spain from the mid-1930s to the mid-1970s, did not look kindly on modern art. After all, one of the icons of modern art, *Guernica*, was painted by the expatriate Spaniard Pablo Picasso as a denunciation of Franco and his generals for ordering German planes to bomb the civilian population of a Basque town during the Spanish Civil War.

This antipathy toward modern art eased somewhat in the waning years of the dictatorship, and the city of Madrid decided to open an avant-garde sculpture garden in 1972 beneath an overpass that spanned the Paseo de la Castellana, one of the city's busiest boulevards. Chillida contributed the largest piece, *Meeting Place III*, an eight-ton concrete structure with two giant arms spreading out like wings. This huge sculpture hovered two feet above the ground, suspended by cables attached to four pillars of the bridge. Once installed, *Meeting Place III* provoked furious controversy, and before the garden was opened, the Francoist mayor of Madrid ordered the cables removed as a safety measure, insisting that the sculpture was too heavy for the bridge. Workmen placed the piece on wooden trestles, a state that everyone knew Chillida could not accept. "It is meant to fill a certain space," he told Henry Giniger of the *New York Times*, "and to give the impression of heaviness even though floating."

The engineers who designed the bridge argued that the overpass could support ten times the weight of the sculpture. Art critics pleaded with the authorities. One critic gave the work a new name—"The Grounded Mermaid." But the mayor was adamant. Cranes removed the sculpture during the dead of night. A hundred saddened supporters of Chillida showed up and, as one participant

Chillida's 1989 two-piece steel sculpture *De Musica* stands in striking counterpoint outside the Meyerson Symphony Center in Dallas. His monument in Guernica (below) was created to commemorate the 50th anniversary of the 1937 bombardment of the town.



LOUIS REENS TASENDE GALLERY; JESUS URIARTE/TASENDE GALLERY

reported, applauded the work as if it were "a mortally wounded gladiator." But the controversy ended happily. Spain transformed itself into a democracy after the death of Franco in 1975. Less than three years later, the newly elected mayor of Madrid overruled the foolish strictures against suspending the piece and decreed that it should now hang from the bridge. The artist Joan Miró, who had boycotted the garden because of the controversy, then donated a sculpture of his own.

A STORY OF EXCITED MOVEMENT

FRESH FROM THIS VICTORY, CHILLIDA COMPLETED ONE OF THE most spectacular works in all 20th-century sculpture. The city of San Sebastian nestles against a long, semicircular bay of the Atlantic, and Chillida embedded three steel structures, each weighing 11 tons, in the cliffs and rocks at the western edge of the bay. He called the trio *Peine del Viento (Wind Combs)*—a dramatic grouping that seems to tell a story of excited movement. A vertical comb, protruding from a boulder in the water, reaches upward with clawlike fingers while similar appendages of the two horizontal combs onshore twist and yearn toward each other and toward their brother in the water.

"I began studying for this when I was very little," Chillida told me when I visited, brushing the wet steel with his fingers. He remembers coming to this part of the shore when he was 2 years old and feeling enchanted by the sea. "I have a very special connection with the sea," he has said. "She knows everything. I love to walk near the sea like children like to walk with their father." He describes the site of *Wind Combs* as "a very, very special place for me. . . . I never chose the place. The place chose me."

With democracy secured in the late 1970s and '80s, demand grew throughout Spain for Chillida sculptures in outdoor public places. Chillida produced imposing works in steel and concrete for Barcelona, Guernica, Vitoria, Seville and other Spanish cities. The monument in Guernica has special significance for him because the town was the medieval capital of the Basque country. Commissions came from other European cities as well, especially from Germany, and from the United States. These monumental pieces made Chillida's work more familiar and accessible to the public than ever before.

Chillida rejects the notion that he is an abstract sculptor. Instead, he calls himself a "realist sculptor"—but a realist who does not focus on appearances. By this he means he is not trying to depict people and events but to show ideas and emotions. At their best, his works brim with movement and tension. Huge concrete arms extend in a welcoming embrace from *Homage to Tolerance*, his mammoth

JESUS URIARTE/ASENDE GALLERY

sculpture in Seville, for example. His largest work for the United States, *De Musica*, the 81-ton steel sculpture that stands in front of the I. M. Pei-designed Meyerson Symphony Center in Dallas, features two pillars with branches that reach out but do not touch.

While commissions for large public pieces poured in, Chillida bought a 16th-century stone *caserío*—a traditional four-story Basque farmhouse—in the nearby village of Hernani and proceeded to renovate it. The artist left wooden beams and a narrow section of the top floor in place but gutted the rest of the caserío so that some of his giant sculptures could be placed there. Even larger works dominate the grounds outside the farmhouse.

MOUNT TINDAYA SEEMED IDEAL

SOME CRITICS BELIEVE THAT CHILLIDA'S CREATION OF A VAST space within the farmhouse was a rehearsal for creating a vast space within a mountain. Chillida came up with the idea in the mid-1980s and then proceeded to search for a mountain. He looked in Italy, Finland and Switzerland before settling on Mount Tindaya on sparsely populated Fuerteventura in the Canary Islands, off the coast of West Africa.

Tindaya seemed ideal. A mining company was already extracting trachyte, a decorative rock, from one side of the mountain, and Chillida could position the entrance to the interior on the site of the quarry. As Chillida envisioned his mountain sculpture, a visitor would stand at the entrance and look back at more than a mile of lava-laden earth extending to the sea. The visitor would then walk down a corridor almost the length of a football field before reaching the massive cube of interior space carved within the mountain. Light would come from two shafts that would penetrate the summit. The visitor, Chillida hopes, would feel the smallness of mankind and the immensity and force of space.

But Chillida did not anticipate the problems that would be spawned by his project. Delays have been caused by environmentalists afraid of damage to the mountain, anthropologists worried about the loss of what they believe may be the footprints of prehistoric man, engineers who have still not completed a study on whether the digging can be done safely, and investigators looking into accusations of corruption between politicians and the mining company that has been quarrying the trachyte. Although the Canary Island government gave the project final approval in late 1998, Chillida is concerned that politicians might back down if the problems intensify. The frustration has made him testy and defiant. He told reporters recently, "The Tindaya project will be finished someday even if I am not here to see it."

The troubles over the mountain coincided with a bout of near depression. But Chillida, in an unusually frank interview not long ago, did not blame the controversy for the attacks that made him feel like "everything was falling apart." The sculptor conquered this funk by listening to Bach and other music, reading philosophy and poetry, and forcing himself by sheer will to act as if he did not feel the near depression. Still a productive artist these days, Chillida is powered by the sentiment expressed in the line of a poem that he has cited often over the years. Quoting the French poet René Char, Chillida has told many interviewers trying to understand his work, "One must walk forward into the night."

A former foreign correspondent for the Los Angeles Times, *Stanley Meisler is a frequent contributor to these pages.*

Eulogy to Water (opposite) was commissioned in 1987 for a city park in Barcelona. The precast concrete structure is suspended on steel cables from surrounding cliffs. *Meeting Place III* (below) triggered a major controversy when it was first hung from Madrid's Castellana Bridge in 1972.

F. CATALÁ-ROCA/TASENDE GALLERY

At the 550-acre Polyface Farm, Daniel Salatin moves one of 50 portable pens filled with broilers that prefer foraging on the low grass left behind after the cows have grazed the pasture.

Down on this

the times they are a-changin'

BY VIRGINIA SHEPHERD
PHOTOGRAPHS BY LYNDA RICHARDSON

THERE IS NO DIRECT ROUTE TO JOEL AND Teresa Salatin's Polyface Farm in Virginia's Shenandoah Valley. Their farm may be a mere eight miles from Woodrow Wilson's birthplace in Staunton, but to get there, city folk need to pay attention. Joel Salatin's hand-drawn map is scribbled with more than a half-dozen turns that break off without warning onto skinny roads rimmed with wire fences curving in and out of green rye and golden mustard fields, with names like Hebron, Eidson Creek and Trimble's Mill all marking a history of family, church or the war the South never forgot.

On the other hand, country boys get to the farm in Swoope, Virginia, by gut instinct. They follow the ridges of Little North Mountain or the creek-like Middle River winding through pastures dotted with whitefaced Herefords, low-lying chicken houses and stately brick and white clapboard homes. But most of the clients who make the yearly pilgrimage to the farm to fill their coolers with Salatin's "World's Best Chicken" grip the steering wheel in one hand, the map in the other, and stop at each deserted intersection asking themselves, "OK, now which way?"

Why do they bother? At a time when America's love affair with chicken is threatened by reports of bacteria-loaded birds and eggs, financially strapped farmers, and waterways polluted by waste from confinement poultry operations, these consumers are looking for an alternative that appeals to their health and conscience. And they're willing to pay for it. The back roads journey to Polyface Farm is a road to Mecca for those with a hankering for good, clean, healthy Southern fried.

Joel Salatin, surrounded by his breeding rabbits and his "Pigaerators," believes multispecies housing helps reduce pathogens.

"I'm the county's premier lunatic farmer," laughs the 43-year-old who wears purple suspenders to hold up his blue jeans and dons a tired but perfectly serviceable straw hat to shade his eyes and balding pate. Salatin and his family raise chickens, turkeys, beef cattle, rabbits and pigs in an unconventional farming operation that requires a leap of faith, a sense of humor and a dash of harebrained madness to provide a good living. The work also makes sense to the head, heart and land.

When Salatin goes on the road dressed up in a coat and tie to lecture at alternative agriculture conferences, he looks very conventional as he steps up to the podium. But there is nothing mainstream about this man. He's irreverent about nearly everything and reverent about the rest that matters. Referring to one of his slides showing hogs up to their ears in his cow-manure composting project, Salatin explains: "Instead of using things that rot, rust and deteriorate, we use . . . 'Pigaerators'! They're appreciating tractors. We buy 'em for $50 and sell 'em for $400. They don't need their oil changed, they don't need spare parts, they don't require minimum wage. They don't complain, and the retirement plan is: when you're done with 'em, you eat 'em."

Welcome to Mr. Green Jeans meets Bill Gates. Salatin's holistic farming operation includes "Tenderloin Taxis," "Chick Chalets," "Eggmobiles" and "Harepens." And it's all done without government subsidies, cost-sharing, nutrient management plans or confinement livestock systems. Furthermore, the 550-acre Salatin farm hasn't seen one teaspoonful of pesticide, herbicide, store-bought fertilizer or seed on pasture in 39 years. Still, every year it produces 8,000 broiler chickens, 400,000 eggs from 1,500 laying hens, 100 head of cattle, 100 pigs, 1,000 rabbits, 700 turkeys and 100 pickup-loads of firewood. "Even if this doesn't make economic sense," Salatin insists, "it's still more fun."

But the farm does make money. Yearly, Salatin's operation brings in $200,000. His clear blue eyes narrow as he whispers delightedly, "What we're doing here is impossible!" Joel Salatin has run a farm his way, and he's proud of it.

"OK," says Salatin, "what do we have to do today?" It's 8:30 on a sunny April morning. The redbud is blooming on the hillsides, morning chores are done, and breakfast of scrambled eggs and cheese, grilled sausage, muffins, milk and apple cider is over. Salatin has just returned his Bible to the bookshelf after reading a passage out loud as he does every morning. "It puts us in the right frame

of mind to start the day," he explains.

To go over the workday, Salatin calls a Polyface Farm board meeting to order. Members include his wife Teresa, 19-year-old son Daniel, 13-year-old daughter Rachel and teenage apprentices Brad Feyen from Michigan and Gary Dougherty from Virginia. They sit around the big wooden breakfast table in the 18th-century home that belonged to Salatin's parents. There's a fire in the fireplace.

Salatin starts writing. "We need to get the next paddock ready for the pigs, right?" Murmurs of assent.

He scribbles it down, then looks up at Daniel, who is handsome enough to steal the heart of the prettiest girl in the Valley. "You know, they're calling for rain in the next two or three days. Is the rabbit thing ready?"

Although still a teenager, Daniel operates the multi-thousand dollar rabbit operation, raising 1,000 rabbits to sell to gourmet restaurants in Charlottesville, Virginia, and Washington, D.C. every year. Because Daniel has bred his rabbits specifically to be raised on pasture in movable pens, he is selling a premium product, and farmers across the mid-Atlantic region interested in starting their own business are looking to Daniel to provide them with hardy breeding stock.

Daniel looks at his dad. "I ordered some big feeders, so I'd like to wait to take them out on pasture on Saturday. I'm hoping the feeders will get here by then."

"OK," says Salatin nodding. "Well . . . what about cleaning the compost out of the Raken house?"

"Fine," agrees Daniel. The others nod in approval. Salatin jots down a couple more chores and says, "OK, let's start with the Raken house while we're fresh and strong."

As if on cue, the boys jump up, clap on their cowboy hats and bolt out the door.

The "Raken" house, like nearly everything else on the Salatin farm, has a whimsical name—it's a combination of the words "*ra*-bbit" and "chic-*ken*." The name is designed to mirror its function. At the heart of Salatin's farming philosophy are three basic tenets: diversity, movement and multiple use. The Raken house is just one example of the benefits of such a philosophy. It's a 700-square-foot shed with 40 rabbits suspended in cages about four feet off the ground. About 150 laying hens roam the shed floor, picking up discarded rabbit food and keeping the bedding aerated and composted. Every two weeks, Salatin adds a pickup-truck-load of chips to the bedding to bind with the high nitrogen content of the rabbit and chicken manure. By the end of the year, he's got a two- to three-foot bed of prime compost that floats in your hand and smells, well, earthy, and is spread lightly on his fields. He wouldn't take a million bucks for it. "If we had this much live weight per square foot of either species," says Salatin, pointing to the resting rabbits and purring hens below, "we'd have disease. Neither species is at a density that kicks in the pathogens, so we don't have to use medications or vaccinations." This two-tier production system nets $4,000 in the space of a two-car garage. "Who says you need a lot of land to make money?" grins Salatin.

By the end of the year, he's got prime compost that floats in your hand and smells, well, earthy.

Joel Salatin's kind of commercial farming is radical. On conventional farms, high numbers of a single species are raised in automated controlled facilities, totally removed from their natural environment. These rabbit, poultry and hog operators argue that confinement farming of livestock is the most efficient way to make money, meet consumer demand and ensure a sufficient volume of a product of uniform quality.

Salatin begs to disagree. "We're making an industrial paradigm out of everything in agriculture today," he says. "The system is taking the biology out of raising animals. If conventional wisdom suggests 'a chicken

Daniel Salatin attempts to nab his pasture-raised rabbit, one of 1,000 he sells yearly to gourmet restaurants in Washington, D.C. and Charlottesville, Virginia.

A hoophouse provides winter quarters for rabbits and a flock of Rhode Island Reds, which lay their "divine" eggs in the nest boxes.

ought to lay an egg every day,' then everybody tries to make chickens lay one every day. But when farmers start pushing past what's natural, the costs add up. Nature always bats last."

Salatin has decided to bet the farm on Mother Nature. "It's not just science, it's art, and artists have to think and be creative. We're painting a landscape on our farm."

It all starts with cows. Or it all starts with chickens. Heck, it's a cyclical thing. Salatin has 100 acres of cleared pasture. Every day during the spring, summer and fall, using an electric fence corral as his "steering wheel, accelerator and brakes," Salatin moves 80 head of beef cattle to a fresh pasture to graze. "We're mimicking the behavior of natural herbivore populations to create a perennial prairie polyculture," he says. "We move the cows to a fresh 'salad bar' pasture every day, and at any one time 98 percent of the farm is at rest. We have 40 species of plants, and each provides a different nutrient for the cattle," he explains.

None of the Salatin pastures have been tilled, plowed or seeded. None of the cows receive a mouthful of grain, antibiotics or growth stimulants. But they're butterball fat and don't need any other feed in addition to their hay in the winter. In fact, his cattle don't normally get anything but what's growing on the ground, except some mineral supplements and, twice a year, a mouthful of a biodegradable all-purpose soap, which Salatin uses as a mild worm medicine. He doesn't have a parasite problem, so he doesn't need high-powered wormers. And the reason he doesn't have a parasite problem is because of . . . chickens.

"You've heard of the egret on the rhino's nose?" asks Salatin.

Watch any nature documentary on Africa and you'll see birds following herbivores. And so on Polyface Farm chickens follow the cows, pecking out grass seeds and fly larvae from cow patties, pulling up tender green shoots, dining on small seeds and dispersing the waste into the soil. "We produce about 96,000 eggs a year as a by-product of our livestock sanitation program," says Salatin proudly. Movable henhouses dubbed Eggmobiles accommodate 600 free-ranging hens in the pasture

In another innovative egg-laying model, portable "Hoophouses" and electric "Feathernets" keep the hens in quarter-acre paddocks. The inhabitants of one Hoophouse covered in blue tarp—Rhode Island Reds, Black Australorps and Barred Rock hens—cluck and coo over the fresh pickings in Salatin's diverse pasture like ladies at a church meeting. Grasshoppers and

violets replace tea and cakes, but there's enough fellowship in the scratching to make any prayer group in the Valley proud. Salatin walks to the nesting boxes perched under the hoop to show how they work. Not a good idea. Ruffled feathers aside, the laying hens squawk at this breach of etiquette.

Except that they are chickens, after all. But on Salatin's farm, chickens rule the roost. Every three days, the royal procession moves on to a fresh pasture that suits their discerning palate, and they produce divine eggs.

"The difference is amazing," says Angelo Vangelopoulos, co-owner and chef of the Ivy Inn Restaurant in Charlottesville. "Organic is not the issue. It's the color, the flavor, the texture."

"The eggs are far superior," says Tim Burgess, the gruff young proprietor of the upscale Métropolitain. "I don't think twice about buying the eggs," says Burgess, though they cost twice the price of commercial eggs. "We do a lot of desserts here, and there's no comparison in richness between desserts made with these eggs and those made with commercial ones."

Initially his customers' devotion to his eggs surprised Salatin. He figured he had a good product, produced in an environmentally sensitive way, but he didn't know it was that good. "These chefs are artists," says Salatin. "They tell us the difference."

But his broilers are the stars of the show. Tom Bjornsen, general manager of Tastings, raves that "Polyface chicken tastes like chicken did 30 years ago. It has a clarity and cleanness—a bright flavor that's unmistakable."

So, what is so special about this chicken? It's pastured, and it's moved every day with 80 to 90 of its Cornish Cross buddies in a portable, floorless pen. This is not a new idea. "Any poultry book published before 1950 has photographs of such structures," says Salatin. But he elaborated on a good idea and has nearly 50 chicken

"Polyface chicken tastes like chicken did 30 years ago, with a clarity and a flavor that's unmistakable."

pens staggered across his pastures, home to a batch of broilers every three weeks during the spring, summer and early fall, as well as turkeys for Thanksgiving. The chickens voluntarily eat more greens and 30 percent less feed, cutting Salatin's feed bills and producing birds that are 70 percent lower in fat with 25 times less bacterial contamination than supermarket chickens. His birds pick up nutrients as they fertilize his fields. Then his cows come in to graze the new flush of green. The cows are moved each day, followed by the Eggmobiles, with the process repeated through the season. Get the picture? No manure problem, no fertilizer problem, no disease or parasite problem.

One of the big issues in the livestock business these days is waste management. The problem of disposing livestock waste in a safe and environmentally responsible manner has become national news. The Clean Water Network and the Natural Resources Defense Council, in a comprehensive state-by-state report, cite that animal waste from livestock produces 130 times the waste humans generate in this country every year. The report details the serious environmental problems that can be associated with industrial-scale farming that has high concentrations of animals. In Virginia alone, some 1,300 poultry farms produce more than one billion pounds of manure each year, the nutrient-waste equivalent of 2,600 small towns.

National attention was focused on poultry producers a few years ago when an outbreak of the toxic dinoflagellate *Pfiesteria piscicida* in several Eastern Shore tributaries of the Chesapeake Bay caused alarming die-offs of thousands of fish and associated health risks to humans. Because these rivers drain directly into the Chesapeake Bay, the situation was perceived as a grave threat to the commercial fisheries industry. Studies showed that where *Pfiesteria* flourished, highly enriched loads of nitrogen and phosphorus were also present. Because each year

In the spring when the livestock is moved to pasture, the hoophouse becomes a greenhouse where vegetables such as currant tomatoes (below) are grown.

After gathering a day's worth of eggs, Daniel Salatin, left, and intern Brad Feyen classify the eggs by size. Brood mistress Rachel Salatin (right) looks after the young chicks on the farm.

some 606 million broilers are raised on the Eastern Shore of Maryland and Virginia and all of Delaware, the finger was immediately pointed at nutrient pollution from poultry litter and other fertilizers.

While the poultry industry may not be definitively linked to the *Pfiesteria* outbreak, both Maryland and Virginia took legislative steps requiring closer management of poultry wastes. Tyson Foods and Perdue Farms, in an effort to reduce the amount of phosphorus in chicken litter in Virginia and Maryland, are adding the enzyme phytase to their feed to improve the utilization of phosphorus in the birds' digestive tracts.

Salatin insists the problem is not an abundance of phosphorus but too many birds. One reason he doesn't need a nutrient management plan on his farm is because he raises 8,000 broilers a year compared with the 600,000 broilers raised in one four-house confinement poultry operation. But poultry is big business in Virginia, with cash receipts of $790 million.

If Salatin's operation is so environmentally sound and his chickens are laying the proverbial golden egg, then why aren't all of the conventional poultry farmers in the state trashing their high-maintenance, $175,000 chicken houses, tearing up their restrictive contracts with poultry companies and opting for low-cost chicken pens, farming independence and high profits from pastured poultry operations?

"Pastured poultry is very labor-intensive," says Anne Fanatico, technical specialist with the Appropriate Technology Transfer for Rural Areas, the USDA-funded national sustainable farming information center in Fayetteville, Arkansas. Fanatico was the outreach coordinator for a program sponsored by the Heifer Project International to train 35 farm families using Salatin's pastured poultry techniques.

From the experience of working with these families, Fanatico is an enthusiastic proponent of pastured poultry, but she realizes its shortcomings. She points out the "huge learning curve" for first-timers. "There is so much to learn about weather, predators, brooding, processing, forage and feed," Fanatico says. "The mortality rate on 100 birds can be as high as 30 percent in the beginning."

Additionally, a farmer must learn to promote the product. Salatin is successful in a niche market, where people are willing to pay more for high-quality food. By raising and processing chickens and selling them directly to customers, he can get more money per chicken than the huge commercial companies get in the supermarket. Plus, he doesn't have any packaging or transportation costs.

And Salatin is lucky. Virginia law allows him to sell his chickens directly to his customers because of an exemption in the federal poultry inspection law. But states can differ in their interpretation and use of the law. Fanatico says some farmers are unwilling to risk starting up a pastured poultry business only to be shut down on a technicality.

And even Salatin had to find his customers. He started 17 years ago taking his smile and inexhaustible enthusiasm to every Rotary, Ruritan or local civic club meeting he could wrangle a speaking invitation from to drum up business for his products. It took him over a decade to build up his customer list to more than 400.

"Joel is such a capable person. He can make it all work, and he has

inspired so many people," Fanatico explains. "But I think all the issues involved in operating a successful pastured poultry operation can burn a lot of farmers out, especially if they go it alone." And this just covers the Salatin chicken model. Bringing in his essential diversity of cows, pigs and rabbits adds to the complexity.

Nevertheless, let Salatin get about 30 minutes into one of his talks, and you can hear a pin drop. "I think it's time to build bridges to consumers instead of barriers," explains Salatin. "Let people come to the farm so that children can see where food comes from, how it's produced, and get in touch with the reality of what they eat. When the producer and consumer are close—that's accountability."

Salatin revs up. "We've got to fundamentally change—and I mean 180 degrees—so we can romance the next generation. Otherwise, we're looking at a dying industry."

Salatin isn't just pontificating. How to keep people, especially young people, on the farm is a major challenge. "Until we attract the next generation, we're just wasting our time talking about sustainability and profit margins and the rest of it. The ultimate test is: Which way will our 18-year-olds run when we open the gate?"

Salatin didn't set out to be the leading guru of pastured poultry in the country, though Anne Fanatico insists that he is. "He has been so innovative with livestock and whole-farm planning," she says. But not everyone is thrilled with his methods.

"Speaking at the Cattleman's Association meetings are the worst," says Salatin. "You get a group of about 100 people and all of them are 70 years old. The first thing that happens is that all my jokes get zero response," he grins. "But you've got to understand that my message is threatening to a person 70 years old whose farming experience has never really panned out for him.

"Let children come to the farm so they can see where food comes from, and the reality of what they eat."

It's very emotional." He pauses, and then continues thoughtfully. "Your heart decides what your head will believe. If your heart won't open to it, it's just a waste of time."

"Salatin's operation successfully carves out a true niche market, but there's room for only a few like him," explains Greg Hicks, communications director of the Virginia Farm Bureau Federation. "Most consumers can't afford to pay the premium prices Salatin charges for chicken and eggs. Because of the incredible demand for affordable poultry products, conventional farming will continue to be the norm. Realistically, the farmers who raise birds in large volumes for poultry processors produce a quality, consistent-tasting bird at a reasonable price. These farmers receive a steady income, something few can accomplish with an independent operation."

When asked how well-received he is among conventional farmers, Salatin replies: "Let's get it straight. I'm not." In fact, Salatin is so far removed from the mainstream that the Virginia Poultry Federation, located just down the road in Harrisonburg, Virginia, is barely aware of him. Frankly, Salatin doesn't produce enough to elicit a yawn from the industry. His production is seasonal (he raises chickens according to Mother Nature's rules—you can't put chickens on pasture in the dead of winter), and he's small. His operation is like a no-see-um on the tail feathers of the poultry industry.

But some people are listening. Over the course of a typical week, Teresa logs 70 calls from farmers as far away as Canada and Australia. Every three

The Salatin family processes 300 to 500 chickens in the morning and then holds the finished poultry in chill tanks for afternoon customer pickup.

Daniel, his cousin Nate, and Brad confer outside the Salatin's 18th-century farmhouse after collecting eggs (about 1,200 a day).

years, the Salatins host a Polyface Field Day, inviting the public. At their last one 725 people showed up.

It's taken Salatin almost 20 years to perfect his style of farming, and he's not finished yet. A few years ago, Salatin was listening to a lecture when a slide of a heritage breed of hog appeared on the screen. Salatin overlooked the hog. It was the manure pile the pig was standing on that grabbed his attention. "Hit me like a bolt of lightning," he says. He'd been trying to figure out how to eliminate the machinery from his windrow composting system, where huge mounds of chips and manure need to be turned on a regular basis to make compost. Now it was clear. He'd bring pigs in to do the dirty work.

Salatin confines his cows in the winter, and every week adds chips or leaves to the manure mix, along with a sprinkling of corn. By spring, he's got a three-foot-high "electric blanket" of percolating compost the cows are lounging on. Once the cows move out to pasture, the pigs march in. These pigs are ready, and once they're on that pile, they waste no time. "By next week," Salatin says, looking at his hogs rooting through the compost to get to the corn, "all you'll see is their tails."

No wonder there are plenty of people who are open to this unconventional, unorthodox method of farming. It's fun. But there's something else about it that's even more basic.

"We believe there are things that are right and things that are wrong," says Salatin. "I don't want to make so much money on this farm that we lose sight of what we're here for. And so . . . ," he flashes that impish grin, "that's one reason to give a lot away!" He laughs. Then his eyes narrow and he gets serious. "Now, look. I don't mind making money. But we do give a lot away. We enjoy it."

Salatin doesn't wish to feed the world. He insists his operation can't get much bigger and still maintain its environmental and ethical integrity. He'd rather farmers he meets try a little "landscape painting" on their own. His mantra: there's plenty of room for all to experiment. And that's the way to change the system.

After the Bible lesson that peaceful April morning, Joel paused, bowed his head and prayed. "Encourage us to walk by faith and not by sight. Let us be good stewards of all that You've entrusted to our care, and let us be discerning and wise, and make decisions the way You would if You were right here in person."

Virginia Shepherd is the former editor of Virginia Wildlife *magazine. Lynda Richardson has covered mussels, Carolina dogs and Border collies for* Smithsonian

GOING ONCE GOING TWICE GOING THREE TIMES A NIGHT?

CONGRATULATIONS, YOU MUST BE OVER 50.

Frequent urination, hesitancy, dribbling, a weak stream–these are classic signs of prostate enlargement. In the U.S. 80% of men develop it at some point after age 50.

IS IT INEVITABLE?

New research says no. A healthy prostate is about the size of a walnut; in cultures that follow a certain diet, the prostate remains that size into old age. Normal size is most associated with normal urinary function.

HOW DOES DIET FIGURE IN?

In Asian and Latin countries, where men's diets are rich in isoflavones, prostate health is the general rule throughout a man's life. Isoflavones are natural compounds found in legumes such as chick peas, clover, lentils and soy.

DON'T WANT TO LIVE ON LENTILS? TAKE NEW TRINOVIN.

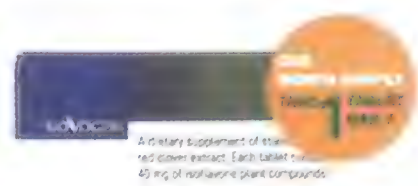
One standardized 40mg tablet a day gives you all the isoflavones of the typical Asian or Latin diet–the equivalent of 10 cups of chick peas!

UNIVERSITY CLINICAL TRIAL

shows marked reduction in the frequency of urination during the night and day with a diet supplemented by Trinovin. These doctor-monitored trials once again demonstrated Trinovin's safety. Trinovin is manufactured to FDA guidelines.

FREE TRIAL OFFER

Call 1.877.TRIAL.99 for a free one-month supply of Trinovin and informative brochures for you and/or your doctor.



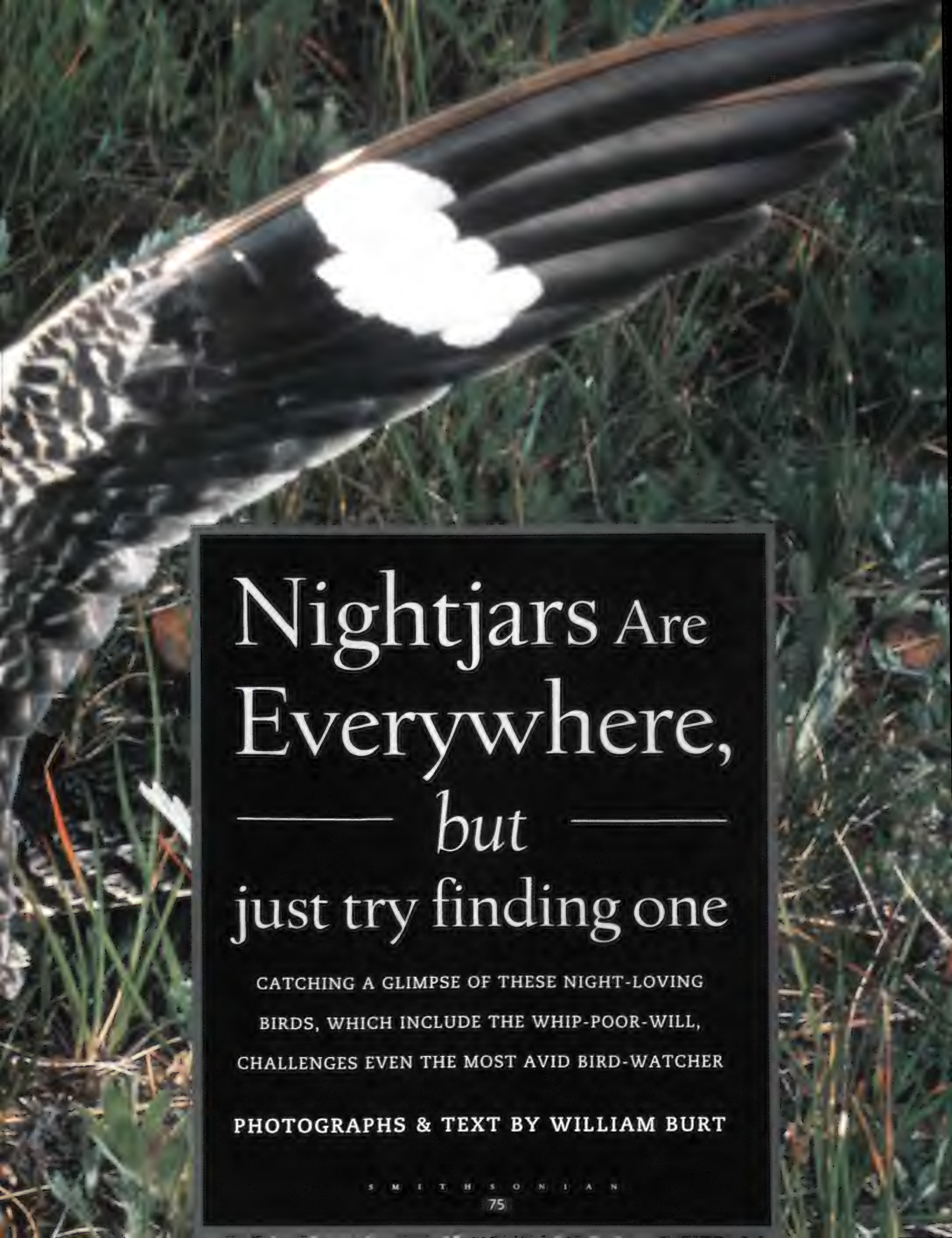
NEW Trinovin PROMOTES PROSTATE HEALTH NATURALLY

© 2000 Novogen, Inc.

The American Urological Association recommends that all men over 50 have an annual prostate examination.

Available at Walgreens OscoDrug Sav-on drugs ECKERD Long's Drugs GNC 40% other fine health food stores or by phone

A common nighthawk defends her eggs in Saskatchewan. Nighthawks also live in urban environments and can often be seen flying at dusk.



Nightjars Are Everywhere, *but* just try finding one

CATCHING A GLIMPSE OF THESE NIGHT-LOVING BIRDS, WHICH INCLUDE THE WHIP-POOR-WILL, CHALLENGES EVEN THE MOST AVID BIRD-WATCHER

PHOTOGRAPHS & TEXT BY WILLIAM BURT

I FIGURED THAT PHOTOGRAPHING A WHIP-POOR-WILL would not be a problem. After all, who has not heard its tireless call in the night woods? I'd photographed two of this continent's most elusive bird groups, rails and bitterns, for this magazine (SMITHSONIAN, August 1988 and May 1995), so I felt this would prove only a modest challenge. But after months of fieldwork I am forced to admit that even seeing one, let alone photographing it, is no easy matter.

The whip-poor-will belongs to a strange group of birds called nightjars (for their "night-jarring" calls), also known by the grotesque name "goatsuckers," for the absurd belief once held that these big-mawed creatures actually did feed on the milk of goats.

But they are strange enough, these eerie moth- and moonlight-loving birds, without the stigma of such superstition. Active largely at dusk and dawn, nightjars can be as swift and silent on the wing as owls, yet are more like bats in the way they vacuum up their prey in flight; they find moths, other airborne insects and sometimes small birds not by echolocation, however, but with their startlingly large eyes. And most remarkable of all, perhaps, is their protective camouflage, which is without equal in the bird world. By day they roost hidden in the shade of woods, either lengthwise on some scraggly branch or on the ground in a welter of dead leaves, twigs and shards of bark, so melded with their surroundings that they become nearly impossible to discern.

Besides the jay-size whip-poor-will, there are four other major nightjar species in the continental United States and Canada, and I hoped to photograph them all: the pauraque of South Texas, the larger Southeastern chuck-will's-widow, the small common poorwill of the West and finally the misnamed common nighthawk, not a hawk at all, nor even especially partial to the night (unlike the other nightjars). Three other members of the family, the buff-collared nightjar and the lesser and Antillean nighthawks, are so similar visually to the whip-poor-will and common nighthawk that I decide not to photograph them. For now, I will concentrate on finding the whip-poor-will and chuck-will's-widow.

A story by Alexander Sprunt, Jr., a Southern ornithologist, gives me an idea on how to proceed. In one of Arthur Cleveland Bent's life histories of North American birds, Sprunt explains how he and a friend explored the woods of Cumberland Island, Georgia, one night with a light: "It was a revelation, in many ways. The night woods were literally twinkling and sparkling with eyes!" The two men saw the eyes of spiders, alligators, deer, raccoons, foxes and even screech owls; occasionally, they also saw the big eyes of a chuck-will's-widow. And they found they could easily catch a "chuck" with their bare hands by sneaking up on it.

Nightjars exhibit this intense eyeshine thanks to something called a *tapetum lucidum*, a mirrorlike layer in the eye that improves night vision by reflecting unabsorbed light back through the retina to the photoreceptors. Can't I, too, find the birds Sprunt's way, chucks and whip-poor-wills alike, and then sneak up with a light on them, lean down and fire off my pictures? I need only to find those eyes.

I try. I try for hours and hours, night after night in the woods of North Carolina, where each of the two species is calling. It augurs well, at first; just off the roadside are green twinklings, the pinpoint eyes of spiders . . . then down the road I see two green slits, and the form of some sleek animal, maybe a bobcat—but it slinks off when I shine a brighter beam on it. But when I enter the woods I have only trouble. It is seldom level, and the thick understory, tangled with blueberry bushes, shrubby oaks, poison ivy, vines and fallen branches, obstructs my path and makes shining difficult.

Many Southerners don't know the difference between the call of the whip-poor-will and its bigger, browner and more southern relative, the chuck-will's-widow. The resilient chuck is still found widely in the South today, despite wholesale changes to its forest home through large-scale development, lumbering of old-growth trees and conversion to the sprawling pine plantations known as pulp farms. The chuck fills the pine forests of the Southeast at dusk in spring and summer with its enthusiastic call. A person might hear several chucks calling at any one time; the same is true for the whip-poor-will in much of its more northern range, although it is more localized and has declined in many places.

My search is not pleasant. It is hot and mosquitoes abound; I feel a strong sense of foreboding in these dark woods. Shadows cast by my flashlight create the shapes of giants and panthers that rear up, then shrink and disap-

Two 6-day-old chuck-will's-widow fledglings blend into the leaf litter of an eastern Kansas forest near Baldwin City.

pear. There are real things to fear, too: old wells and cellar holes, snakes and skunks, and the chance that the police might get a call about my light and show up, expecting some jacklighting poacher.

With all this effort, I'm rewarded with only one glowing response to my light—and that comes from the shard of a broken bottle. And still, the calls continue, as if to taunt me.

I try other things. I stalk birds by their call, sometimes catching a glimpse of their eyes glowing in the trees before they vanish. I try to lure them in close by playing tape recordings of their calls, but this doesn't work either. I try looking for their nest sites during the day, traipsing through woods that had been full of their calls the night before. All I find are ticks and deerflies.

The whip and the chuck are not uncommon birds, as I've said before; but I just cannot get close enough to either. Perhaps my first encounter photographing a nightjar had been too easy. A year earlier I had visited Saskatchewan's Cypress Hills Interprovincial Park, where I walked along a high cobbled ridge admiring the plains below, entranced by their soft, variegated greens and the mottled shadows cast by passing clouds. All of a sudden, a catlike hiss at my feet broke my reverie—and there, with wings held up in stiff, statuesque defiance, sat a common nighthawk on her eggs.

I stood transfixed, not quite believing my eyes; then I pulled my thoughts together. Stay right there, I told her . . . and stepped back slowly. I strode down the hill to the car and returned ten minutes later out of breath but with flash-and-camera outfit in hand. She was still there.

What a contrast to my frustrating experiences searching for the chuck and whip! Of course, Roger Tory Peterson refers to the common nighthawk as the "aberrant goatsucker" because it is sometimes active at midday, hence the one most commonly seen. Indeed, the nighthawk profile is a familiar one in the early evening sky, unmistakable with its chevron-shaped wings and stiff, rowing flight. Unlike other species of nightjars it enjoys a variety of habitats, living almost anywhere so long as there is bare, open ground for nest sites, which can include the flat gravel roofs of urban areas, on which it often lays its eggs. This bird is as happy in downtown Boston, Cleveland or Chicago as it is in the Carolina pines or in the remote hills of southern Saskatchewan.

Reflecting about that defiant nighthawk on her eggs makes it clear to me that the best way to locate the chuck and whip will be to find their nest sites. These birds do not construct nests out of twigs; instead they lay their eggs on leaves or pine needles on the ground. So I search and search some more, alone and with the help of a few stal-

Their nocturnal habits and exceptional camouflage make these North American nightjars easy to hear but devilish to find. Clockwise from top: The neotropical pauraque inhabits the brush of southern Texas; the small common poorwill is found in the deserts and canyons of the West; the whip-poor-will is widely distributed over much of the continental United States; the chuck-will's-widow prefers the forests of the South and East.

wart volunteers; but again these nightjars prove elusive. Clearly, these are creatures a person is not meant to find by *looking*. So I inquire of others who may have *happened* upon a nest site in their work: refuge managers, biologists, birders, Forest Service staff and anyone else who spends time in the woods. Several admit to having stumbled upon a nest site, but, alas, it is always some time in the past.

Then I learn about two men from Kansas, Roger Boyd and Calvin Cink, both biology professors at Baker University in Baldwin City, Kansas, and reputed experts on the nightjar family.

My first contact is with Boyd, an affable man who is not only eager to help but optimistic about our prospects. He tells me that our success depends upon his colleague, Cal, who is a nightjar maven unlike any other. Cal Cink has studied whips and chucks for years in the woods near Baldwin City, about 40 miles southwest of Kansas City. Boyd claims that Cink knows their ways so well that he can find their nest sites almost routinely.

Almost routinely! I tag along with Cink one steamy June morning. We thread our way uphill through sapling oaks to a ridge where both bird species have nested in past years. We carry two coils of rope, each 200 feet long. Atop the ridge, we begin by laying the ropes in parallel, 15 feet apart. It's usually on the upper slopes, Cink says, where the nightjars choose to nest. He cuts each of us a sapling switch the length of a fishing pole. We walk the corridor between the ropes side by side, sweeping lightly back and forth with our leafy switches, to flush any bird that might be sitting unseen on its eggs. We make one pass, then Cink grabs the first rope and lays it out in parallel beyond the second; we walk this corridor, re-laying the other rope ahead and continuing thus, advancing incrementally along the ridge. The thoroughness of the approach is necessary, he says, because inadvertent backtracking can be a big waste of time.

While Calvin Cink is reticent, a few well-aimed questions reveal that he knows more than almost anyone about these mysterious birds. He has studied them for 20 successive seasons, learning not only their vocal repertoire, including the various flight notes and peepings of the young, but also certain previously unknown aspects of their life histories: how long, for instance, the young stay at the nest site or remain in parental care, and with which parent—observations a person can only make by knowing their secret nest sites, and watching from the cover of a blind. Each year he finds approximately 12 whip-poor-will and 6 chuck-will's-widow nest sites. One year he found the nest sites of 16 whip-poor-wills. In all my other inquiries I'd failed to come across anyone who had discovered even one on purpose except Roger

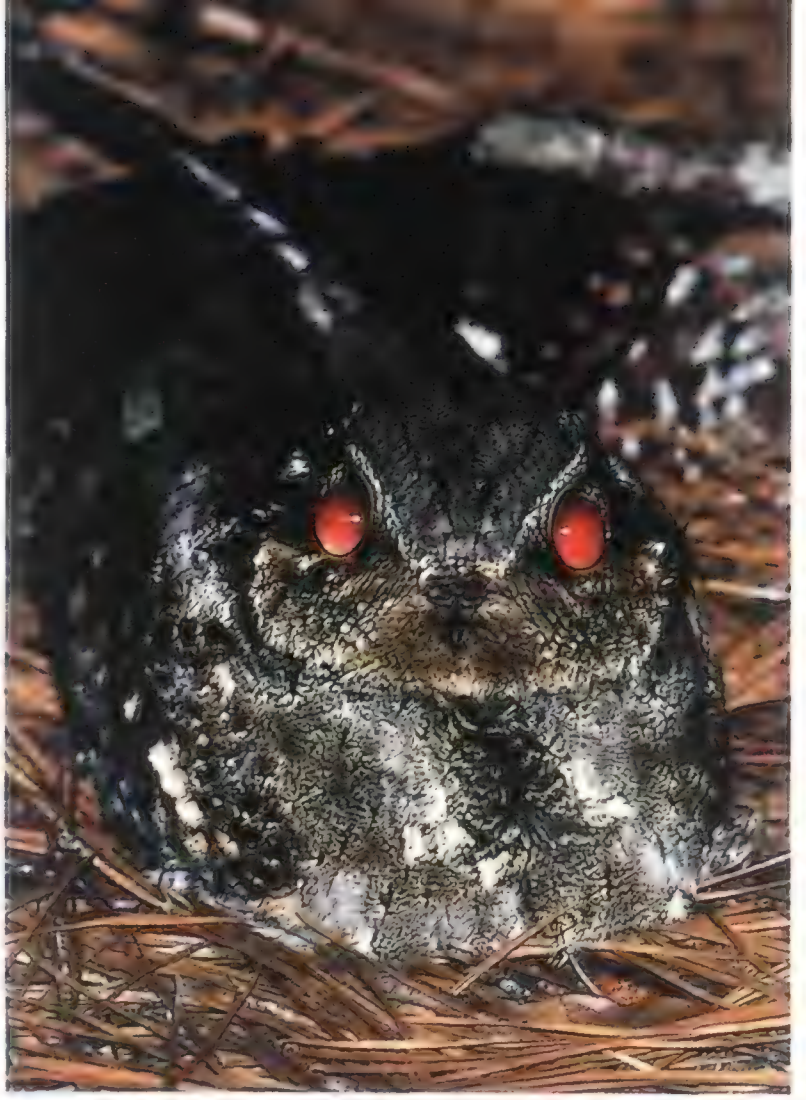
Boyd, who has found several.

We work our way over most of the ridge, sweeping the brush with our switches, when Cink suddenly turns his head sharply and freezes: "Hear that?"

Among the usual woodland bird sounds, but just barely audible, is a weak mewling whistle: *wheew, wheew* . . . and my only response is a look of blankest incomprehension.

"It's a young one," he says, "a whip-poor-will or chuck." With his head still canted in concentration, he begins homing in. Then a big brown mothlike bird flies up—it is a mother chuck-will's-widow, and she circles widely, uttering an impassive *wok, wok*, then alights high up on a branch ten yards away. Undistracted by the display, Cink makes his way directly to the base of a black oak and bends over to examine the leaf litter.

"There," he says at last, pointing to a place of absolutely no apparent consequence, only four feet away. Then I see them, or rather decipher them: two dead-leaf-colored youngsters. They are about 6 days old, Cink thinks, and they are the single most amazing case of feathered camouflage I've ever seen. The mother obviously will not cooperate for photographs, so I content myself with pictures of the young ones—plump and expressionless, huddled together like two woolly toads.



Top: A mirrored layer in a chuck-will's-widow's eyes reflects light and improves the bird's night vision. Above: Chucks usually lay two eggs, each barely larger than a quarter.

Next it's Roger Boyd's turn to take me out into the woods near Baldwin City. Two days before we set out, Cal Cink had found and marked a whip-poor-will's nest site with eggs. Again, it is a lesson in nightjar camouflage. For minutes, Boyd stands still and scans intently with binoculars before he discovers the sitting mother bird. She is so at one with the surrounding chaos of dead leaves, sticks and shadows that he has to give me detailed directions repeatedly before I find her too. Whenever I take my eyes off her, even momentarily, Boyd has to redirect me. As I sneak up within camera range, Boyd continues to issue directions. At last, I have my whip-poor-will.

In the end, I would go on to find and photograph all of the other major U.S. nightjar species. I tracked the pauraque in the brushy country along the lower Rio Grande in southern Texas. The manager of the Santa Ana Refuge had to be convinced that my night work with expensive cameras would not make me an easy target of illegal aliens. On the levees, I didn't see a human soul but was accompanied by the drumming song of toads, armadillos blundering out from the brush and sphinx moths attracted to my light. And I also found the near-pigeon-size pauraques in my beam, their eyes igniting like rubies under a jeweler's light. After several days, I was able to move close enough to one individual and photograph its fine-penciled patterning, its long sweeping tail and its tiny beak.

I found the smallest of our nightjars, the common poorwill, in the pine-covered hills of northwestern Nebraska. So wary are these birds that playing tapes and stalking with a light brought no success. Finally, one individual came within six feet of me when I played a tape. Why was this one so different? Was it a matter of its personality, or just propitious timing with respect to its mating cycle? Whatever the reason, I spent an hour photographing it.

What a trial these birds had put me through! A photographer could not invent a more frustrating subject: so easy to hear, yet so hard to see. All told, it had taken me five years to photograph five nightjar species in the wild. So much for the "modest challenge" I had expected when starting out!

William Burt has spent the past 20 years photographing the least known and most elusive birds of North America.

PRINCESS

Grand Class Cruising

Where there's a whim, there's a way.

What do you want from a cruise? A day that's planned down to the minute or a day filled up with possibilities—including the option to simply relax in the sun? You decide. You see, the Grand Class ships of Princess℠ offer you the freedom to do "what you want when you want℠"... coupled with a level of service where courtesy reigns. When you cruise with Princess, you'll have access to all the amenities of a big ship—from round-the-clock dining to non-stop entertainment—yet, thanks to our unique ships' designs, you'll never feel lost in a crowd. Grand Class Cruising. Only from Princess. For a free planning kit, call 1-800-PRINCESS.

PRINCESS CRUISES®

Featuring Grand Class Cruising

1-800-PRINCESS

www.princess.com

Rescue and Restoration

A TOURING EXHIBITION HIGHLIGHTS EFFORTS TO CONSERVE ARTWORKS OF HISTORICALLY BLACK COLLEGES AND UNIVERSITIES

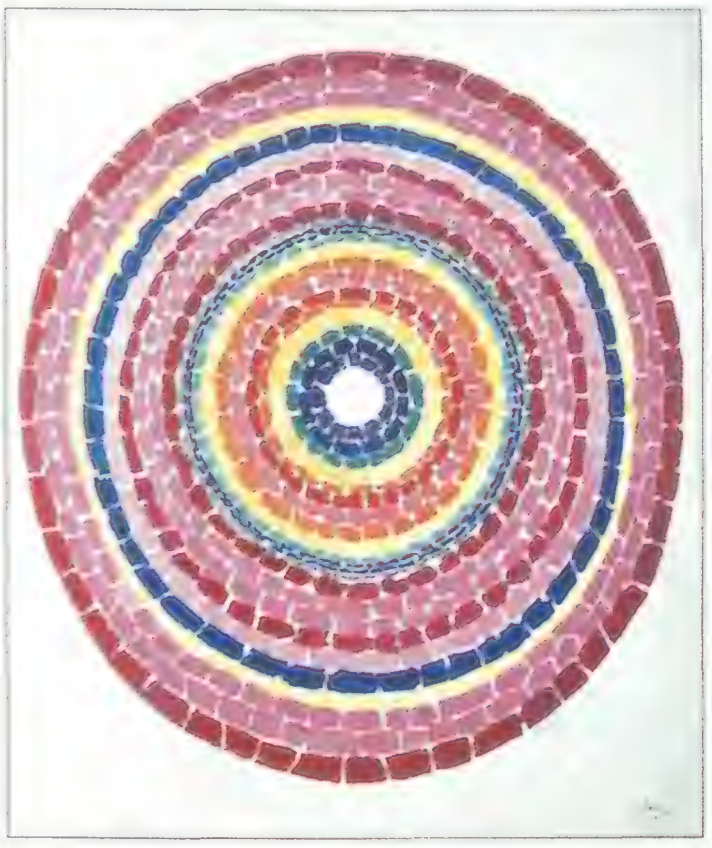
SEVERAL YEARS AGO AN ART CURATOR in search of a work by an African-American artist visited the gallery of a leading historically black university. He was anguished by what he discovered. "I saw major works by Romare Bearden, Wifredo Lam, Edmonia Lewis, William H. Johnson, and others stacked cheek to jowl," without benefit of a climate-controlled environment or proper storage. The painting he sought was punctured and torn.

That experience stayed with Jock Reynolds, director of the Yale University Art Gallery, and inspired him and Richard J. Powell, chair of the Department of Art and Art History at Duke University, and a host of their colleagues to launch a project to conserve the art collections at black colleges.

The ambitious undertaking involved the collaboration of six universities, several museums, corporate donors, art experts and student interns, and significant hands-on work at the Williamstown Art Conservation Center in Massachusetts. After five years, the participants had repaired and preserved some 1,400 artworks and assembled an eye-opening touring show of 260 of them titled "To Conserve a Legacy: American Art from Historically Black Colleges and Universities."

Now on view at the Clark Atlanta University Art Galleries and the High Museum of Art in Atlanta through September 24, the exhibition spans more than a hundred years, from mid-19th-century works such as Edmonia Lewis' neoclassical sculptures and Robert Duncanson's pastoral landscapes to more contemporary pieces like the 1960s-era color-drenched *Jazz Musician* (opposite) by James Weeks and the brilliantly hued *Spring Flowers Near Jefferson Memorial*, a mosaic-like canvas by Alma Woodsey Thomas (below).

Such a feast for the eyes should stimulate interest in the artistic treasures at black colleges and encourage support of conservation, Powell said. "Ultimately, we hope we have planted a seed about the importance of preserving one's legacy." —*Marian Smith Holmes*



ART FROM SIX HISTORICALLY BLACK UNIVERSITIES UNDERWENT A VARIETY OF TREATments at the Williamstown conservation laboratory, including removing dirt and old varnish, repairing of tears, regluing and remounting, and delicate inpainting to cover cracks. A lithograph by James Lesesne Wells, *Negro Worker* (opposite, top left), was immersed in deionized water to help fade stains, and William E. Artis' elegant terra-cotta sculpture, *Bust of Miss Coleman*, which arrived in two pieces, was rejoined using an acrylic resin. Not all of the art in the exhibition is by African-Americans. The universities' collections include works by Native Americans, who attended the colleges, and several whites, who donated pieces, such as Arthur Dove's abstract above, *Swinging in the Park (there were colored people there)*, and Georgia O'Keeffe's cityscape *Radiator Building—Night, New York* (opposite, top center). *Black Belt* (opposite, bottom) by Archibald J. Motley, Jr., evokes the bustling urban nightlife of a Chicago neighborhood.

P. 82 HOWARD UNIVERSITY GALLERY OF ART, WASHINGTON, D.C.
PP. 83 & 84 FISK UNIVERSITY, TENNESSEE

HOWARD UNIVERSITY GALLERY OF ART, FISK UNIVERSITY, HOWARD UNIVERSITY GALLERY OF ART, HAMPTON UNIVERSITY MUSEUM, VIRGINIA

"TO CONSERVE A LEGACY," WHICH TRAVELS TO NORTH CAROLINA, TENNESSEE AND Virginia, includes works from six black universities: Clark Atlanta, Fisk, Hampton, Howard, North Carolina Central and Tuskegee. Historically black colleges, created after the Civil War to educate former slaves and free blacks, struggle financially, "so art conservation as a budgetary item is low on the list," Richard Powell said. Students from the colleges trained at the Williamstown center, acquiring skills to use at campus galleries. Among the works conserved were (clockwise from above) William Harper's Impressionist *Landscape*; an Arthur P. Bedou photograph, *Booker T. Washington in New Orleans*; William Henry Johnson's *Mom Alice*; *Sahdji*, an ink drawing by Aaron Douglas; and *An American Family* by artist William Sherwood McCall.

TUSKEGEE UNIVERSITY

THE Mad Ha

tter

NOTHING IS MORE ORDINARY THAN A PAPER BAG, which is why these hats are so extraordinary. The Hawaii artist Moses (at left, modeling *Halley's Hat*, made to honor the astronomer) crafted more than 250 of them in a remarkable creative outburst that lasted almost ten years. Moses says he "feels like the luckiest guy in the world" because he was given "The Paper Bag Hat Assignment." He can't explain why, but throughout the 1980s he was obsessed with paper bag hats. He saw designs in trees and in mountains. Some are quite simple—just a bag cleverly folded and shaped into a head covering. Others, like *Anthurium* (upper right) and *Gothic Knight* (lower right), rely on the bag's crisp texture to hold intricate pleats. Quite a few, such as *Two/Flat Knight* (p. 91), are held together with vast quantities of white glue. Waiting for the glue to dry was the most tedious part of the construction process. Local merchants gladly donated bags, and Moses used thousands. The rays of *Sun Rook* were made from at least 100 paper bags, which were twisted tightly, bent in half and glued onto a form, so that more than 200 points bristle from its crown. To achieve the soft texture of *Beethoven* and *Dahling*, bags were twisted and crumpled repeatedly until the fibers just gave up and the paper became like flannel. Moses did so much folding and twisting that he developed serious tendonitis. At the time, Moses lived in a Chevy van and used the project room of the local library as his studio

Periodically, he'd fill his van with the current crop of chapeaus, drive down to Hapuna Beach with a borrowed camera and ask passersby if they'd like to be photographed wearing one of his creations. People's reactions were always positive. Perhaps they caught a dose of Moses' infectious enthusiasm. The bulk of his Crowning Glory collection is owned by the Mingei International Museum in San Diego, California. Martha Longenecker, the museum's founder and director, marvels at these "imaginative, amusing, whimsical and timeless sculptural forms." Moses is one person who can suggest you put a bag over your head without your being insulted. —*Elizabeth J. Erskine*

BEETHOVEN

TOPPLED CONE

UFO

PATIENCE

MARLEY HAIR

JOHNNY REB

VALIANT

TWO/FLAT KNIGHT

TWO/FLAT KING

CIRCA: SAMOA

DAHLING

SUN ROOK

Vostok

looking for life beneath an Antarctic glacier

BY RICHARD STONE

IMAGINE FOR A MOMENT THAT YOU ARE A STRANGE DEVICE called a cryobot. You are a glint in an ocean of snow. A feeble summer sun glazes the drifts, nudging temperatures up into the low 40s—below zero. The bone-dry air here at the coldest spot on Earth doesn't bother your steel skin or the companion nestled inside your belly. Nor does the glare from the endless white affect you, although a human being without sunglasses would go snow-blind in a few hours' time.

You plunge into a hole in the ice sheet drilled by boiling water and sink through the rapidly cooling water nearly two and a half miles to the shaft's bottom, where the pressure is a crushing 366 times that at sea level. In a final rite of purification in the utter darkness, you rinse in hydrogen peroxide to kill any surface or ice-dwelling microbes that might have hung on for the ride. A heater in your nose cone switches on, and you start thawing your way down the homestretch.

For the final couple hundred yards the path is glassy smooth, like November ice on a New England lake. As the shaft above freezes, sealing your icy grave, you at last encounter slush, then a little farther on, water—you've burrowed all the way through the thick ice blanket covering the Antarctic continent. Your cargo door opens and your companion eases out. The smaller probe, called a hydrobot, revs up its propeller and disappears into the gloom on a mis-

IN WHAT MAY BE THE WORLD'S LARGEST LAKE NEVER SEEN BY A HUMAN EYE, THE SEARCH BEGINS

In the artist's conception (opposite), a cryobot, top right, has drilled through 2.5 miles of glacier and then frozen lake ice to reach the liquid water of Lake Vostok. It has released the hydrobot, bottom center, to explore the depths. Scientists speculate that there may be hydrothermal vents, bottom right, and fumaroles, bottom left. This illustration is not to scale. The micrograph (above) is an image of a bacterium found in the frozen water of the lake.

sion to explore one of our planet's last great virgin territories: Lake Vostok.

Isolated from the rest of the world for longer than humankind has walked the Earth, Lake Vostok's stygian depths have cast a come-hither spell ever since the lake's true proportions—roughly half the area of Lake Ontario—were reported four years ago. The lake does not freeze solid because of heat rising from the Earth's interior. For biologists, Vostok beckons with the promise of organisms possessing untold strategies for surviving in a lightless crypt. Paleontologists, meanwhile, would love to get their hands on the thick muck presumed to coat Vostok's bottom, which might encase fossils of undescribed life-forms that roamed a continent once balmy enough for dinosaurs. Climatologists might analyze the lake's sediments for clues to Antarctica's climate before it became the frigid wasteland it is today, while cosmologists could mine the lake floor for a wealth of extraterrestrial particles that have rained on Antarctica through the eons and have been dumped by the ice sheet into Vostok's basin. Taking a dip in this wintry wonderland, says Chris Rapley, director of the British Antarctic Survey, "is one of the most high-profile and interesting projects of the next decade."

A voyage to Vostok could also be a big step toward a discovery that, if it were to happen, would surely rank among the greatest of all time: finding life elsewhere in our solar system. Bearing an uncanny resemblance to Vostok is the Jovian moon Europa, which recent spacecraft images suggest is covered by an ocean about 60 miles deep (far deeper than any on Earth) topped by a rind of ice that in spots could be less than six miles thick (SMITHSONIAN, May 1997). If life arose in Earth's primordial ocean, could it not then have also arisen—or be on the verge of doing so—in Europa's? Lake Vostok could serve as a proving ground for probes designed to explore Europa without spiking the broth with microbial ingredients from our own planet.

French scientist J. R. Petit examines a section of ice core taken from 10,980 feet below the Russians' Vostok Station in Antarctica.

Now scientists around the world are joining forces to blaze a trail to the mysterious lake, despite some formidable hurdles. There are, for example, the delicate matters of lining up millions of dollars from several countries and establishing a hierarchy to oversee the project, as well as developing the technology to even get there—technology that also must protect Vostok's pristine waters from contamination.

Yet those captivated by the lake's allure foresee no insurmountable obstacles. And they are especially tantalized by hot new evidence that life does exist in Vostok: images of microbes in refrozen lake water taken from a core sample. According to Richard Hoover, an astrobiologist who leads the search for evidence of microbial life beyond Earth at NASA's Marshall Space Flight Center in Huntsville, Alabama, "We're seeing things we've never seen before."

At first nobody paid attention to hints that a behemoth lay beneath the ice. In 1960 Soviet pilot R. V. Robinson described remarkably flat stretches of the East Antarctic ice sheet, discernible only from the air, near a remote Soviet outpost called Vostok Station. He called these indentions "lakes." A decade later British airborne radio surveys of the ice sheet's thickness proved the flier right, revealing mirrorlike reflections that were interpreted as pools of water sandwiched between the ice sheet and the bedrock. These and later soundings have pinpointed at least 76 subglacial lakes in Antarctica, the largest by far extending under Vostok Station. After analyzing all the older studies, along with newer satellite sensing data, British and Russian scientists published a report in 1996 describing Lake Vostok as a body of freshwater much longer than it is wide, covering somewhere between

The Desert That Glistened With Water.

Southeastern New Mexico is home to mesquite and chaparral, mesas and horizons that shimmer with heat. For animals of this parched land, survival comes with water. So people who work nearby helped design and build a system of dozens of unique watering units that gather, store and distribute water to bobcats, antelopes, hawks and more. Quenching nature's thirst and giving it a chance to survive.

Chevron

People Do.

www.peopledo.com

©1998 Chevron Corporation

3,900 and 5,400 square miles and plunging to a depth of 1,600 feet or more under the research station.

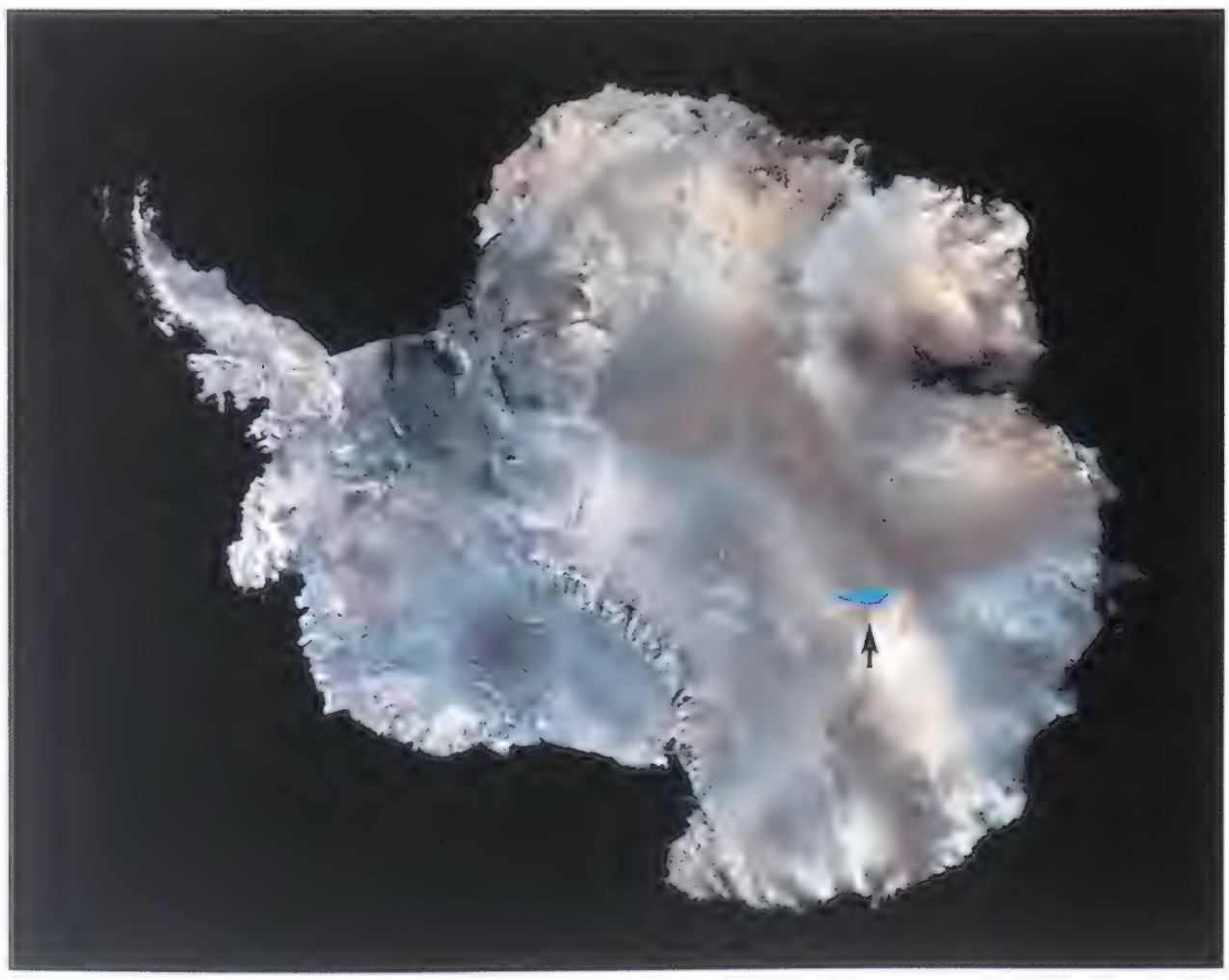
As news broke of the biggest geographic feature discovered on Earth in the 20th century, the Galileo spacecraft was beaming back images of an icy orb fractured in crisscrossing patterns that resemble ice floes in the Arctic Ocean. The tortured surface of Jupiter's moon Europa is shaped by what is presumably an ocean below—but the images and other data do not reveal how much of that ocean is liquid versus ice. Whatever it is must taste salty, the wavelengths of infrared light absorbed by the ice suggest it's laced with sodium carbonate and magnesium sulfate. "This is the stuff that appears to constitute the brine in the Europan ocean," says Frank Carsey, an earth scientist with NASA's Jet Propulsion Laboratory (JPL) in Pasadena, California.

ON THE ROAD TO EUROPA

A POLAR OCEANOGRAPHER HIMSELF, Carsey was the go-to person for JPL engineer Joan Horvath, who in 1996 sought his advice on how a spacecraft might puncture Europa's icy crust. It didn't take long for the two to focus on Lake Vostok. Carsey seized on the idea of using Vostok as a parallel for a Europa mission. That fall he made a pitch for a project involving players from three NASA fiefdoms: the space, earth science and technology divisions. He did not know that just the day before, NASA administrator Dan Goldin had lambasted the earth types for not reaching out to their space colleagues. As Carsey said later, "My timing was impeccable."

Given the green light to draft a Vostok strategy, Carsey and Horvath in 1997 opted in favor of a thermal probe, or cryobot. The idea is that upon reaching the water beneath the ice on Lake Vostok, the cryobot would release a hydrobot equipped with miniature sensing instruments.

The NASA scientists are not the only ones drawn to the siren call of Vostok. In recent months a chorus has risen for a concerted effort to get to know the lake and whatever creatures might lurk there. Not surprisingly, some of the most eager voices are coming from Russia, where scientists view the lake's exploration as a fitting new endeavor for the station.



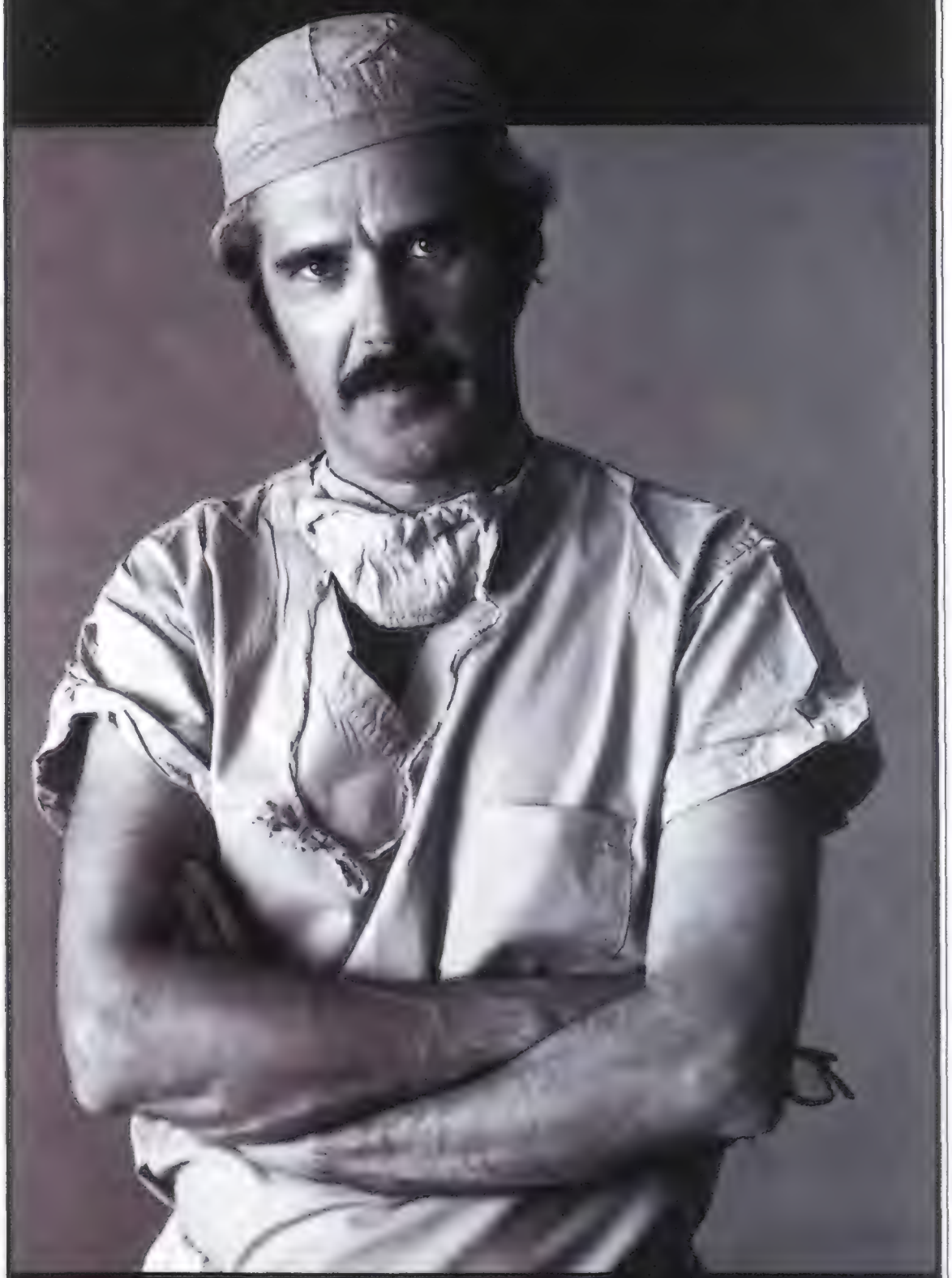
The size of Lake Vostok is indicated by the bean-shaped outline at right center in this composite satellite image of Antarctica.

Vostok has a legendary reputation. Since Soviet scientists established this icy toehold at the south geomagnetic pole in 1957, crews have manned it year-round, shuttering it for only a few seasons under dire circumstances. Since then Vostok has earned another title: the pole of cold. Situated in a region that probably hasn't seen the mercury rise above zero for millions of years, the station set a record low for Earth's surface: -128 degrees Fahrenheit on July 21, 1983. The station (as was a spacecraft that carried Yuri Gagarin, the first man in space) is named after the flagship of Russian explorer Fabian Gottlieb von Bellingshausen, who the Russians claim was the first person to glimpse Antarctica, on January 27, 1820.

Flying to Vostok from the American McMurdo Station on the coast is like being whisked by helicopter from Portland, Oregon, to the top of Mount Hood: because the station is perched on a bulge on the ice sheet nearly 11,500 feet above sea level, most newcomers experience mild altitude sickness—numbing fatigue and sharp headaches—for their first day or two.

The weather and tales of hardship have given the *Vostochniki*, those who work through the long, dark winter there, a reputation for perseverance. It's a land where it takes phenomenally harrowing experiences to stand out

Sleep deprivation can be deadly, doctors discover.



Are You At Risk?

TAKE THE 5-MIN. NATIONAL SLEEP TEST AND FIND OUT.

Recent studies have convinced doctors and medical experts that a lack of sleep can have serious consequences to your health. One study conducted by the California Department of Health found that people who get less than the recommended amount of sleep have a 70% higher mortality rate.* With only 1 in 3 Americans getting the proper amount of sleep... and one source estimating that this year alone up to 24,000 people will die and millions more will face disabling injury as a result of sleep problems... experts nationwide are sounding the alarm. America faces a sleep deprivation crisis.

A lack of sleep can affect your immune system, slow your reflexes and impair your judgment.

When you don't get the quality sleep your body needs, you're "running on empty." Your judgment is impaired. And your reaction time in dangerous situations is longer.

40 million Americans suffer from serious sleep problems— 95% remain undiagnosed.

Increasingly, doctors are looking at patient sleep problems as a major medical concern. Still, the majority of those with sleep problems are unaware they're in any danger. This growing epidemic can lead to serious injury and early death.

The National Sleep Foundation wants to save your life.

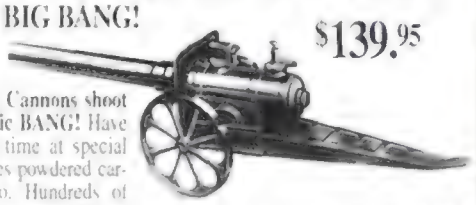
The National Sleep Foundation is a non-profit organization dedicated to educating Americans about the causes and effects of our growing sleep crisis. The National Sleep Foundation and Select Comfort—"A Sleep Solutions Company"—have partnered to help you identify the sleep problems you might have... before they catch up with you.

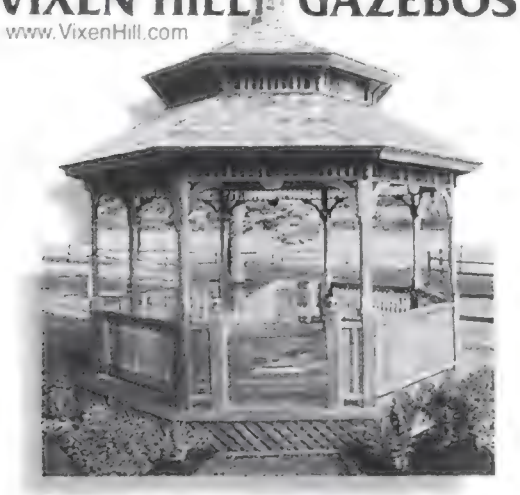
A free 5-minute test is all it takes. Get speedy results and find out where you stand.

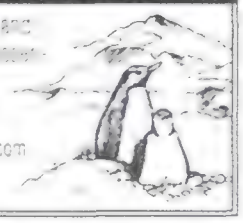
Our simple 5-minute test will tell you if you may have a sleep problem, and give you the opportunity to request more information about sleep solutions. The test and results are free and could save your life.

CALL 1-800-954-6554 Ext. 23881

A PUBLIC SERVICE OF THE NATIONAL SLEEP FOUNDATION & SELECT COMFORT.

Celebrate July 4th & All Events
CARBIDE CANNON
BIG BANG!
$139.95

Mammoth Cannons shoot with terrific BANG! Have a bang-up time at special events. Uses powdered carbide ammo. Hundreds of shots for few cents. All metal construction with large, rugged cast iron wheels. Machined brass mechanism for easy loading and firing. Authentic turn-of-century design. Handsome decor when not in use. Made in USA to last a lifetime. Available in 3 sizes: 9" cannon, **$59.95 postpaid;** 17" cannon, **$109.95 postpaid;** 25" cannon (shown here) with rapid firing and automatic loading, **$139.95 postpaid.** The larger the cannon the louder the bang! **Carbide ammo, about 100 shots, $7.50; 3-pack $18.00. Spark plugs, 3-pack $2.00.** Send check, money order or call. Visa, MasterCard accepted by mail or phone. Give card number & expiration. Money-back guarantee. Send for **FREE CATALOG!**
The Conestoga Co., Inc., Dept S, PO Box 405, Bethlehem, PA 18016
★★ Call 1-800-987-BANG ★★
www.bigbangcannons.com

VIXEN HILL GAZEBOS
www.VixenHill.com

Dept SM-9 • Easton, PA 18042 • 800-423-2769

EXPLORE ANTARCTICA...
A unique way to enjoy the geography and history of the world aboard the "Ice-breaker for Clipper Adventurer during the austral spring and summer, 2000/2001.
1-800-282-7245 www.clippercruise.com

❖ CLIPPER

Cartouche
18K Solid Gold or Sterling Silver.
A Talisman with *Your Name* in Hieroglyphics.
Protective Charms, Powerful Amulets, Beautiful Gifts.
P.O. Box 309-SM, Delmont, PA 15626 E-mail: sm@cartoucheltd.com
For a Free Catalog Call 1-800-283-4978

COPPER CANYON
Costa Rica and More

Explore Mexico's Copper Canyon and Costa Rica on our deluxe escorted and custom adventures. For free newsletter
1-800-926-1140
www.calnative.com
The California Native, 6701 W. 87 Pl, Los Angeles, CA 90045

www.e-knits.com
e-knits.com
Knitting on the Net

The tower at right houses a drill that has gone down 2.2 miles, stopping just short of a lake that may contain at least bacterial life.

among the everyday risks posed by whiteouts, body-swallowing crevasses and, of course, constant cold. A fire in April 1982 knocked out power to the station, killing a mechanic and forcing the rest of the station's crew to spend two dark weeks in a small room, barely heated by an oil stove, until emergency generators could be brought on line. "The team barely survived," says Vladimir Papitashvili at the University of Michigan, who worked at Vostok the following year.

The scientific exploits, too, are compelling, and include a masterpiece: a record of Antarctic climate over the past 420,000 years, interpreted from carbon dioxide and other gases trapped in the ice. Drilling into the ice sheet, which piles up at a rate of about an inch a year at Vostok, is like turning back the clock—the deeper the ice retrieved, the older it is.

At the station, in a cavern hewn from the ice, Russian climatologists maintain an unusual library: pieces of the core itself (SMITHSONIAN, May 1989). Alexandr Krassilev plucks what looks like a rolled newspaper wrapped in plastic from a wall lined with hundreds of cardboard cubbyholes. "This is some of the oldest ice on the planet," says Krassilev, gingerly cradling the opaque log in a hand heavily mittened against the chamber's constant -67 degrees. Krassilev, a drilling engineer from the St. Petersburg Mining Institute, offers his visitors a chance to hold this valuable key to Earth's past. "Don't drop it," he says lightly, his breath freezing into twinkling diamond dust that drifts to the packed-snow floor.

A Lake Vostok mission comes at a critical time for the decaying station. Its only landmarks are the 32-foot-tall drilling tower clad in peach-colored sheet metal, and a haphazard array of radio antennas and machinery in various states of disarray. As for the inhabited part of the station, says Papitashvili, it's "almost completely covered by snow." The crew has abandoned some buildings that are now buried in the drifts. Station entrances have triple doors to retain heat, but fit loosely in the door frames. Inside, the cramped labs double as living quarters, heated by hazardous-looking electric radiators. An artificial Christmas tree with scraggly trimmings perches on an unplugged microwave oven in the mess hall. The only midafternoon diner is a Russian technician hunched over borscht, black bread and compote. An exercise bike and a folded Ping-Pong table gather dust in a corner behind him.

In February 1998, the drilling ceased 2.2 miles into the ice, about 400 feet above the lake's surface. At these depths the freshwater ice forms large, clear crystals—useless to climatologists, but a potential gold mine for biologists, as this ice is lake water that has frozen to the bottom of the ice sheet. Scientists who have laid their hands on this essence of Vostok have watched a new world unfold before their eyes. "We're looking at microorganisms essentially

MALAIZE EXTRA FLUFFELLOS

as they're coming out of the ice," says Richard Hoover. With Sabit Abyzov of the Institute of Microbiology in Moscow, he has used an electron microscope to image white filaments that are hundreds of microns in length, just visible to the human eye. Hoover speculates they may be strands of a microbial mat dislodged from the lake floor. "It could have floated upward and come to rest against the ice-covered roof," he says.

Also getting a piece of the action last year was John Priscu of Montana State University. Working with a section of ice drawn up from near the bottom of the borehole, Priscu's group has found rod-shaped bacteria (p. 93). DNA analyses point to several kinds of bacteria in the lake ice. If these bacteria are alive in the lake, he says, "there's plenty of food down there." His group has measured about as much dissolved organic carbon in the ice sample as is found in an average North American lake.

HOW SUCH A LAKE CAME TO BE

TIED TO THE QUESTION OF WHAT might survive in it is the riddle of Lake Vostok's origins. The land around the station has long been thought to be a stable region of crust, called a craton. That suggests the lake bed was scoured out by glaciers, much like Lake Ontario was during the last ice age.

Cratons can develop rifts or depressions, however. Lake Vostok's narrow, crescent shape and great depth are reminiscent of Lake Malawi, which fills a basin in a rift valley in East Africa. Making a stronger case for rifting are the mysterious Gamburtzev Mountains. Geologists have no good theory for the origins of the mountain patch, which juts anomalously from the otherwise flat terrain. Ancient rifting is as good an explanation as any. And if the Gamburtzevs are still growing, as some scientists speculate, that would lend credence to a recent hypothesis by Robin Bell at Columbia

One of a kind.
Incomparable.
Simply exceptional.
Now you don't have to fly to South America to see the Amazon or Orinoco Rivers and exotic ports-of-call such as Devil's Island, Boca da Valeria, Santarem, Puerto Ordaz and more. Only Royal Olympic can give you these extraordinary cruises sailing roundtrip from Fort Lauderdale aboard the brand new 836-passenger Olympic Voyager, one of the fastest ships in the world.
Book early and save 25%-45%, depending on departure date. For details and a free deluxe brochure, see your travel agent or call Royal Olympic at 1-800-872-6400.
UNIQUE AND EXOTIC
17-DAY AMAZON CRUISES
12-DAY ORINOCO CRUISES
11-DAY MAYA CRUISES
All Roundtrip Ft. Lauderdale
Royal Olympic Cruises
THE FINE ART OF CRUISE ADVENTURE
www.royalolympiccruises.com

Special Care for Special People
Progressive education, home environment for the mentally challenged child and adult. Opportunity for educational progress at any age—multiple recreational and social activities. A year-round program with an active and full lifestyle among friends on an 800-acre bluegrass estate. Est. 1893. Please write or call for brochure, or visit our web site.
STEWART HOME SCHOOL
4200 Lawrenceburg Road, Dept. O Frankfort, KY 40601
John P. Stewart, M.D., Resident Physician
Phone 502-227-4821
www.stewarthome.com
BOOKS ON TAPE® #1
World's Largest Selection
• Bestsellers on cassette
• Nearly 5,000 titles all full-length
• Call for more information
THE OPERATOR
TOM KING
(800) 582-9666
LADYBUG BRACELET
Fourteen Ladybugs all in a row. Toggle closing.
Sterling $150, or 14k Gold $760.
Add $4 handling. Satisfaction Guaranteed.
Catalog, (800)767-6411 or Web: breakell.com
J.H. Breakell & Co.
132 Spring Street, Dept. SLBB Newport, RI 02840
HISTORY
Sadigh Gallery
Ancient Art
FREE CATALOG 800-426-2007
DRINK TEA?
THE FINEST TEAS AND GIFTS
WWW.TEALUXE.COM
1-888-TEALUXE
Gourmet Provence
Tour the French countryside in a small group enjoying wine tastings, cooking classes and luxurious accommodations.
800-820-8485
Novel Expeditions www.novelexpeditions.com

Penguins, elephant seals, sculpted glaciers, and the legendary tale of Sir Ernest Shackleton and the mighty *Endurance* Order a brochure today.

ZEGRAHM EXPEDITIONS
800-628-8747
www.zeco.com

ANTARCTICA
SOUTH GEORGIA • FALKLANDS • ANTARCTIC PENINSULA

World's Largest Inventory!
China, Crystal, Silver & Collectibles
• *Old & New*
• *125,000 Patterns*
• *6 Million Pieces*
• *Buy & Sell*
Call for FREE lists.
REPLACEMENTS, LTD.
PO Box 26029, Greensboro, NC 27420 Dept. SM
1-800-REPLACE (1-800-737-5223)
www.replacements.com

MEN'S WIDE SHOES
EEE-EEEEEE, SIZES 5-13
FREE catalog • High quality • 160 styles
HITCHCOCK SHOES, INC.
Dept. 21G Hingham, MA 02043
1-800-992-WIDE www.wideshoes.com

GALAPAGOS
The best small ship journeys to the Enchanted Isles...guaranteed.
1•800•543•8917
www.nathab.com
NATURAL HABITAT ADVENTURES

AUTHORS WANTED
800.278.8533
rutledgebooks.com
RUTLEDGE BOOKS, INC.
Dept. SM, P.O. Box 315
Bethel, CT 06801
Successful, full service subsidy publisher can transform your manuscript into a quality book... and promote it. Send completed work for a **FREE** assessment. **FREE** brochure.

PolarBearTours.com

University's Lamont-Doherty Earth Observatory. Bell thinks that rifting is still occurring. This, she says, could explain three moderate earthquakes in the past century that struck within 100 miles of Lake Vostok.

An active rift would provide a vital ingredient for life. The energy thrusting the Gamburtzev range upward must have melted portions of underlying crust and heated the lake bed, perhaps nurturing unique ecosystems around scaldingly hot geothermal vents—like those that sustain life independent of sunlight at the bottom of the Pacific.

Comprehending such survival strategies would influence a mission to search for organisms in Europa's ocean, which some NASA scientists hope will be launched in the next decade. An ocean alone is insufficient for known life: some form of energy must trickle into the system. It's unlikely that sunlight, necessary for plant life on Earth, can penetrate Europa's ice cover. More likely, the energy comes from gravity. Specifically, the solid material of Europa flexes as the moon moves closer to and then farther from Jupiter as it travels in an elliptical orbit. The flexing would generate heat. And Europan microbes will have figured out how to tap such energy sources.

DETECTING LIFE UNDER THE ICE

WHETHER SCIENTISTS FIND CLUES TO Europa's life in the most forlorn lake on Earth will depend on what they search for. Retrieving a sterile sample from under the ice sheet is an expensive and complicated proposition, so the first experiments will be done with remote instruments that transmit data by radio or by cable to the surface. One obvious experiment is to measure the pulse of life—metabolic activity—by tracing the incorporation of radioactive carbon into biological molecules. Other instruments could count cell numbers or measure nucleic acids, the raw stuff of DNA molecules. Any assay must be designed to spot life-forms that would prefer to remain anonymous.

One intriguing possibility is that Lake Vostok became an arena for the ultimate contest of survival of the fittest. Before icing over, the lake might have supported a thriving ecosystem with many species of microorganisms, plants and fish. "Life was very abundant on Earth when Vostok formed, so there is no doubt that things should have been in, on or around the lake site from its genesis as an ice-covered lake," says Ken Nealson, a biologist at JPL. But as ice piled higher, choking off photosynthesis, the organisms depleted the remaining oxygen—bringing on something akin to a global famine in Vostok. The grittiest oxygen-consuming bacterium, the last of its kind, could be clinging to life even today.

Whether Vostok is home to a sole survivor or many novel microbes, it would be a disaster to upset the delicate balance by introducing surface organisms. True, microbes are blown in from distant lands all the time; much of the dust that has settled on the Antarctic ice sheet originated in Patagonia, the region between the Andes and the Atlantic in southern South America.

Snow that fell on the ice above Vostok half a million years ago, freighted with Patagonian dust perhaps, is just now melting into the lake—where it releases microbial cargo crushed by the accumulations above. Any organism that survives this punishing passage has earned a chance to eke out an existence in Vostok. On the other hand, microbes that sneak aboard a cryobot—either at the surface or on the way down—could irrevocably alter whatever fragile web of life exists down there.

For this reason a Vostok mission has drawn the attention of groups that are not convinced that the benefits of probing the lake outweigh the risks to a possible ecosystem. "There's little justification for this project," contends Ricardo Roura, a geologist by training

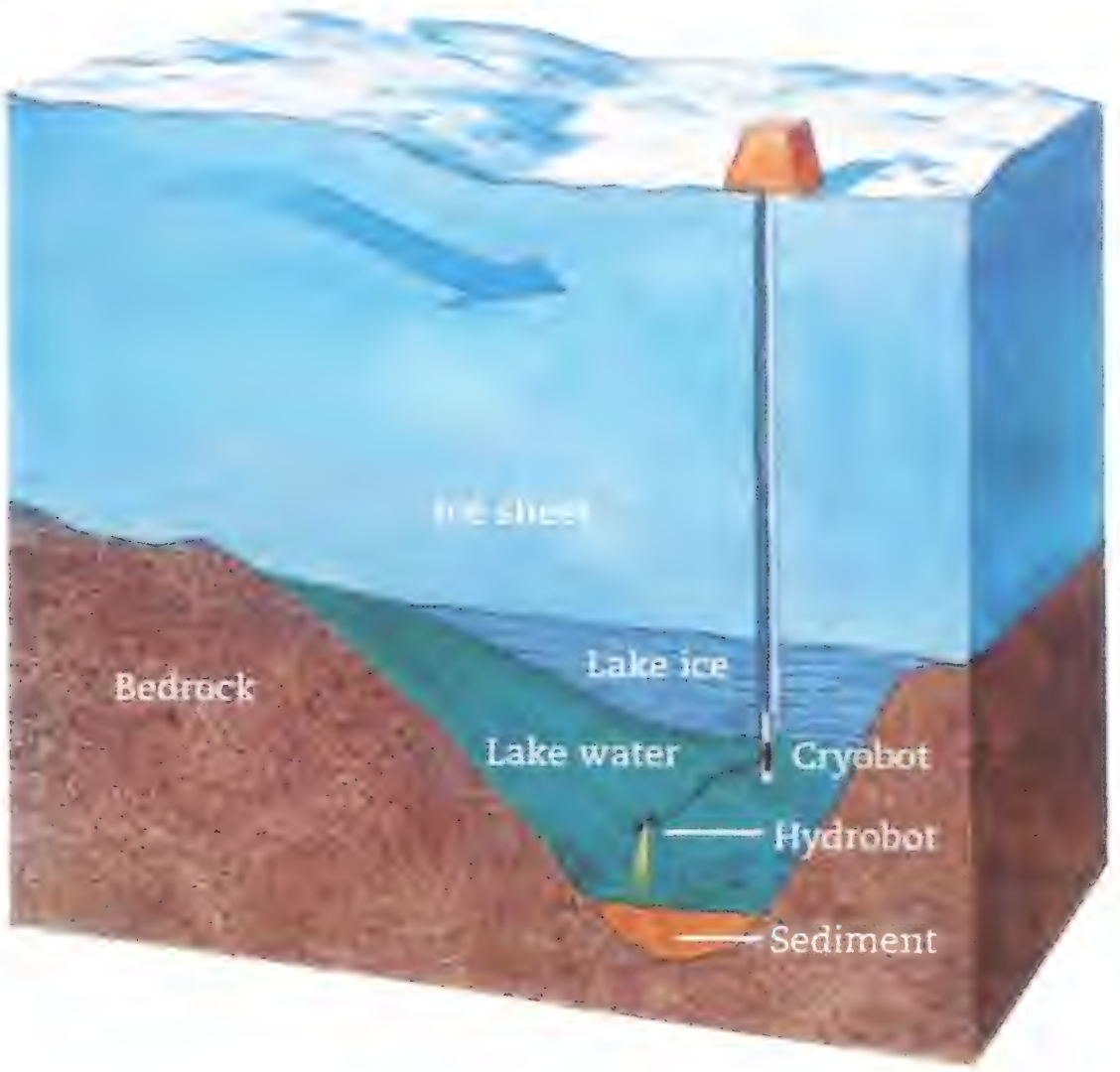
who lobbies for environmental protection on behalf of the Antarctic and Southern Ocean Coalition. His organization argues that any probe sent down must be completely sterile. "Science does not exist in isolation of environmental protection," he says.

That message is not lost on scientists, says Carsey. "We fully appreciate that contamination is bad science," he says. Thus a daunting task for JPL engineers is to devise a method of sterilizing a probe after it has passed through much of the ice sheet but before it penetrates the lake itself. One idea is to equip a probe with a powerful ultraviolet light for frying any lingering life-forms. Another is to have it spritz itself with sterilizing agents such as hydrogen peroxide, which rips into cell membranes, destroying any microbial life it contacts. After the carnage all that is left is water, oxygen and the remains of shattered biomolecules. "Nobody can complain about that," Carsey says.

So far, however, he and his team have struggled to find funding for their project. As they wait for government dollars to materialize, they have held discussions with drug companies—"they would pay millions to get ahold of some lake water," Carsey says—and entertainment companies that might like to film a mission to the lake or otherwise glean profits from publicizing the adventure. The latter category of potential bedfellows strikes some people at NASA as strange, Carsey admits.

But Carsey no longer must beat the scientific drum on his own. A meeting in Cambridge, England, last fall whipped up enough interest for an international team to start putting together a game plan for a Vostok mission as early as 2005. "It's an extremely difficult mission for any one country to mount on its own," says Erick Chiang of the National Science Foundation. That's why some say it

Schematic cutaway (not to scale) shows how frozen lake water lies immediately below the moving ice sheet.



RON WOOD/WOOD RONSAVILLE HARLIN

Swim At Home™

Swim or exercise against a smooth current adjustable to any speed or ability. Ideal for swimming, water aerobics, rehabilitation and fun. The 8' x 15' Endless Pool™ is simple to maintain, economical to run, and easy to install inside or outdoors.

FOR FREE VIDEO CALL
(800) 233-0741, Ext. 1135

Visit www.endlesspools.com
or write Endless Pools, Inc.
200 E Dutton Mill Rd, Dept. 1135
Aston, PA 19014

AUDUBON

Specializing in the finest original natural history art from the 17th to 19th centuries. Featuring works by Audubon, Gould, Besler & many others. Call or write for our brochure.

KENYON OPPENHEIMER, INC.
Wrigley Building, 410 N. Michigan Ave.
Chicago, IL 60611
312-642-5300 *Est. 1969*

VOYAGES TO THE ENDS OF THE EARTH

Year round expedition-style cruises.
Our response to the timeless
urge to explore and discover.
Just for people like you!
Call us for your free brochures at
800-548-8669
www.societyexpeditions.com

Society Expeditions
Antarctica • Alaska • Russia • South Pacific

Archive Your Photos!
Kodak PHOTO CD Scanning Services
IMAGERS®
www.imagers.com
800.398.5820
1575 Northside Dr. Ste.490 Atlanta 30318

THE POKE BOAT®
IT'S EVERYTHING A CANOE ISN'T.
A canoe is tippy. A Poke Boat isn't. It's remarkably stable.
A canoe is hard to turn and difficult to keep in a straight line. A Poke Boat isn't. It stays in a straight line, yet is easy to maneuver
A canoe is heavy
A Poke Boat isn't
It weighs only 22 pounds - built with aircraft strength
You can buy more than a canoe.
For more information, give us a call.
859-986-2336

Europa, one of Jupiter's four large moons, appears to be covered with ice and may have an ocean underneath.

might be wise to slip into a smaller subglacial lake first. Carsey, however, argues that a better dress rehearsal would be to send a cryobot through an ice shelf and into the Ross Sea off Antarctica. If the sterilization equipment were to fail there, he says, contamination wouldn't be a big deal. "It's inappropriate for us to put Lake Vostok on some kind of pedestal and declare one of the other subglacial lakes a pointless environment that we can mess up," he says.

As scientists chart a course to the once undiscovered lake, their next indirect glimpse could come from a project that would bridge the past and the future of Vostok Station. For more than a quarter century Russian scientists have drilled into the ice to sample gas bubbles hinting at what the region's climate was like over the millennia. The drilling stopped about 400 feet above Lake Vostok to prevent the kerosene, which keeps the borehole open, from contaminating the waters below. Some scientists have talked about lowering a laser to the bottom of the borehole, where it would shoot a beam of light through the final stretch of ice. Reflections could unmask any biomolecules floating in Lake Vostok—offering a peek at the secret inhabitants of a lost world.

Richard Stone, the European news editor of Science, *has crisscrossed Siberia for his book,* Mammoth, *due out in spring 2001.*

PERSONALIZED CARTOUCHE JEWELRY
HANDMADE IN EGYPT
Translate Anything into Ancient Egyptian Hieroglyphics
18k Gold and Silver Pendants, Rings and Bracelets
Call us for a free brochure and more information
Discoveries Egyptian Imports
2910 Business Center Dr. dept. SM · Alexandria, Va. 22314
or visit our website at:
http://www.egyptianimports.com
"Love"
1-800-237-3358
Celebrating our 20th Year Anniversary!

www.vancort.com
Telescopes ⋄ Kaleidoscopes ⋄ Compasses
Orreries ⋄ Magnifiers
Timepieces & Weather Instruments
Van Cort Instruments, Inc.
South Deerfield, MA
800-432-2678 413-665-2000

EUROPE $350 ROUNDTRIP
Madrid, Amsterdam, Rome $350
Hawaii $238. Australia $850.
Bangkok, Seoul, Manila, Singapore $400. ALL ROUNDTRIP!
1-800-822-0888 x2207
Cheaptrips.com
(303-215-9000) www.cheaptrips.com
Subject to availability, membership, & departure

Rent a villa in Italy
DISCOVER PARADISE FOR A WEEK OR LONGER
ALL SIZES, PRICES AND LOCATIONS THROUGHOUT ITALY
800 280 2811
www.theparkercompany.com
ITALIA

WHAT'S IT LIKE OUT THERE?
Barometric pressure? Indoor/outdoor temperatures? Wind speed/direction? Rainfall? What's the exact time?
Incredible OREGON SCIENTIFIC Weather Stations and Atomic Clocks: $59 and up!
givemeair.com
more info: 1-800-443-4554

COPPER CANYON
CUSTOM DESIGNED ADVENTURES
Naturalist-trained native guides • Remote wilderness lodges
Birding • Natural History • Cultural Contacts • Photography
Sierra Madre train • Tarahumara & Mayo Indians
1-800-843-1060 www.canyontravel.com
Columbus Travel, 900 Ridge Creek, Bulverde, TX 78163

Country Curtains®
At The Red Lion Inn • Stockbridge, MA 01262
CURTAIN CHARM FOR EVERY HOME!
FREE 76-page Color Catalog. Ask for Dept. 35100
1-800-876-6123 or www.sendcatalog.com

WANT TO KNOW OUR BIRDING TIP OF THE MONTH? CHECK OUT OUR WEBSITE:
ventbird.com
800/328-VENT (8368)
OR 512/328-5221
VICTOR EMANUEL NATURE TOURS

HARP SEALS
Visit the harp seal pups on the pack ice of the Gulf of St. Lawrence.
800-368-0077
www.travelwild.com
TravelWild Expeditions SM52

LITTLE ST. SIMONS ISLAND
PRISTINE & PRIVATE GEORGIA ISLAND GETAWAY
10,000-acres, 7-mile beach...only 30 guests.
Gracious accommodations, gourmet cuisine.
Activities and Nature Programs.
1-888-733-5774
www.LittleStSimonsIsland.com

AFRICA ◆ CHINA ◆ INDIA ◆ JAPAN ◆ NEPAL ◆ SRI LANKA ◆ TAIWAN
Since 1989
UPTON TEA IMPORTS
Purveyor of the World's Finest Teas
1-800-234-8327
www.uptontea.com
Free catalog listing over 220 varieties of garden-fresh, loose tea
231 South St. * Hopkinton, MA 01748

AUTHORS WANTED
Leading subsidy book publisher seeks manuscripts. Fiction, non-fiction, poetry, juvenile, religious, etc. New authors welcomed. For free 32-page illustrated guidebook TD-72, call 1-800-821-3990 or write to:
Vantage Press, 516 W 34th St., New York, NY 10001

LONDON FLATS
Short Term - Privately owned
PARIS PROPERTIES - COTSWOLD COTTAGES
THE LONDON CONNECTION
TOLL FREE PHONE: 888-393-9120
FAX: 801-393-3024
E:MAIL sales@londonconnection.com
www.londonconnection.com

22nd year tours of
BORA ÖZKÖK & CULTURAL FOLK TOURS
TURKEY
Quality tours for less
Call 1-800-935-8875
http://www.boraozkok.com • E-mail:tourinfo@boraozkok.com
CA Tour Operator Reg. #2011417-40

JPL/NASA

The Object at Hand [p. 22]

National Museum of American History Star-Spangled Banner Website: http://americanhistory.si.edu/ssb/

The Star-Spangled Banner: The Flag and the Anthem It Inspired by Lonn Taylor, Harry N. Abrams, 2000

Fort McHenry: Home of the Brave by Norman G. Rukert, Bodine & Associates (Baltimore), 1983

So Proudly We Hail: The History of the United States Flag by William Rhea Furlong and Byron McCandless, Smithsonian Institution Press, 1981

Forest Fires [p. 32]

California Department of Forestry and Fire Protection Website: http://www.fire.ca.gov/

Firefighter's Handbook on Wildland Firefighting by William C. Teie, Deer Valley Press (Rescue, California), 1994

Eduardo Chillida [p. 56]

Chillida 1948-1998 by Kosme de Barañano, Guggenheim Museum (Bilbao, Spain), 1999

Montaña Tindaya: Eduardo Chillida, The Regional Government of the Canary Islands, 1997

Chillida by Peter Selz, Harry N. Abrams, 1986

Chillida, Guggenheim Museum, New York, 1979

Eduardo Chillida: Basque Sculptor (video) by RM Arts and Basque Television, Home Vision (Chicago), 1985

Chillida Dibujos by Kosme de Barañano, Guggenheim Museum (Bilbao, Spain), 1999

Salatin Farm [p. 64]

Pastured Poultry Profits by Joel Salatin, Polyface, Inc. (Swoope, Virginia), 1993

Salad Bar Beef by Joel Salatin, Polyface, Inc. (Swoope, Virginia), 1995

You Can Farm by Joel Salatin, Polyface, Inc. (Swoope, Virginia), 1998

Nightjars [p. 74]

Nightjars: A Guide to Nightjars and Related Nightbirds by Nigel Cleere, Pica Press (Sussex, England), 1998

Life Histories of North American Cuckoos, Goatsuckers, Hummingbirds and Their Allies by Arthur Cleveland Bent, Smithsonian Institution, 1940

African-American College Art [p. 82]

To Conserve a Legacy: American Art from Historically Black Colleges and Universities (exhibition catalog) by Richard J. Powell and Jock Reynolds, Addison Gallery of American Art (Andover, Massachusetts) and the Studio Museum in Harlem (New York), 1999

Lake Vostok [p. 92]

"Antarctica's Lake Vostok" by Martin J. Seigert, *American Scientist*, November-December 1999

"The Strangest Home on Earth" by Richard Monastersky, *Science News*, October 2, 1999

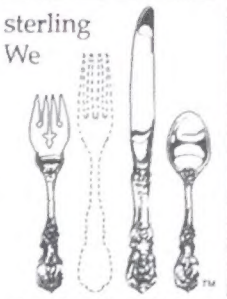
Lake Vostok Workshop: Final Report, National Science Foundation sponsored workshop, Washington, D.C., November 7-8, 1998

"A Large Deep Freshwater Lake Beneath the Ice of Central East Antarctica" by A. P. Kapitsa et al., *Nature*, June 20, 1996

SMITHSONIAN (ISSN 0037-7333) is published monthly by the Smithsonian Associates, 900 Jefferson Drive, Washington, DC 20560. © Smithsonian Institution 2000. All rights reserved. Reproduction in whole or in part without permission is prohibited. Editorial offices are at 900 Jefferson Drive, SW, Washington, DC 20560 (202-786-2900). Advertising and circulation offices are at 420 Lexington Ave., New York, NY 10170 (212-490-2510). **Subscription Prices:** United States and possessions: $26 a year payable in U.S. funds. Canada and all other countries: add $13 (U.S. funds) for each year. 80 percent of dues is designated for magazine subscriptions. Current issue price is $4 (U.S. funds). Back issue price is $5 (U.S. funds). Periodical postage paid at Washington, DC and additional mailing offices. **Mailing Lists:** From time to time we make our subscriber list available to companies that sell goods and services by mail that we believe would interest our readers. If you would rather not receive such mailings, please send your current mailing label, or an exact copy, to: SMITHSONIAN, Mail Preference Service, P.O. Box 420311, Palm Coast, FL 32142-0311. **Subscription Service:** Should you wish to change your address, or order new subscriptions, you can do so by writing SMITHSONIAN, P.O. Box 420311, Palm Coast, FL 32142-0311, or by calling 1-800-766-2149 [outside of U.S., call 1-904-445-4662]. Postmaster: Send address changes to SMITHSONIAN, P.O. Box 420312, Palm Coast, FL 32142-0312. Printed in the USA.

MISSING A PIECE OF YOUR PATTERN?®

Replace pieces or add to your sterling silver at up to 75% off retail. We specialize in new and used flatware and hollowware. Over 1,200 patterns in stock. Call or write for a free inventory of your sterling pattern. *(We buy sterling silver, with a careful appraisal for maximum value.)*

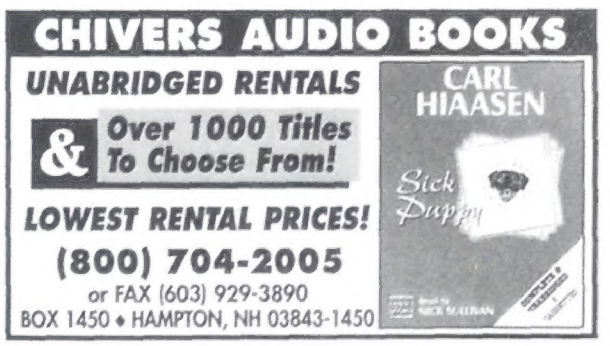


Shown: Francis I by Reed & Barton.

Beverly Bremer SILVER SHOP

3164 Peachtree Rd. NE, Dept SM, Atlanta, GA 30305 / Mon.-Sat.10-5
Tel: 404-261-4009, Fax: 404-261-9708 www.beverlybremer.com

WARPLANES.COM
The Collectors Choice
Makers of Fine Aerosculptures
Hand Carved From Solid Mahogany
Exquisitely hand painted markings and details.
Satisfaction Guaranteed!
Museum Quality • Sizes 16" to 22" Stand Included • From $99.95
Catalog & Orders
800-950-9944
www.warplanes.com
Over 750 Models In Stock
14255 N. 79th St. • Scottsdale, AZ 85260



GALAPAGOS
Learn about the Origins of Species from our gifted naturalist as you explore Darwin's islands in comfort aboard small, deluxe yachts. Swim with penguins and sea lions, savor equatorial sunsets, and really get away! Free brochure and video.
INCA
Since 1976
1311-SG1 63rd St.
Emeryville, CA 94608
(510) 420-1550
Sg1@incafloats.com
www.incafloats.com

Memorial Tear ®
This is a tear drop to be worn in memory of someone loved. The rose inside the tear is a symbol of the love that never dies.
+ CHRISTIAN FAMILY JEWELERS
800-466-8092
Please add $3.95 for shipping and handling
www.christianfamilyjlrs.com
Pendant / Lapel Pin
Sterling $28.95
14K Gold $89.95

THE LAST PAGE

Every Dog Wants to Have Its Day in Court

BY BRUCE WATSON

THERE'S A NEW PUPPY IN OUR house, and we're treating her like a queen. At dawn's early whimper, we hop out of bed and let Lucca outside. We feed her on demand. When she chews a book or breaks a priceless vase, we say, "Atta girl, Lucca!" We're not just being kind, we're being cautious. We can't afford another lawsuit.

Animal law is a burgeoning field. Attorneys with clients named Ginger and Snuggums are stepping to the bar, and every dog is having its day in court. Cats, too, not to mention a dolphin named Rainbow who, with the help of an animal lawyer, recently sued her aquarium. Two years ago, the U.S. Court of Appeals for the District of Columbia ruled on a case involving the right of a lonely chimp named Barney to have a companion share his cage.

Some may see this as animal rights run amok, but our other dog, Rosie, begs to differ. A white mutt easily muddied by a romp outside, Rosie may look meek, but she's in the forefront—forepaw, perhaps—of animal law. Back when other pets were just howling about their rights, Rosie was getting even.

Two years ago, Rosie sued my wife and me, charging "1) that defendants fed plaintiff inedible chunks of stale fodder laughingly called 'dog food'; 2) that defendants regularly pet plaintiff on the head, resulting in a crippling loss of self-esteem; and 3) that plaintiff's so-called 'owners' treated plaintiff as if she were not a sentient being but mere property."

Go ahead and make lawyer jokes. We laughed, too, until we found out Rosie was seeking $1 million in damages. What's more, her lawyer threatened to take the case all the way to the Supreme Court, if necessary.

We tried to settle. First we offered Rosie steaks. Her lawyer wouldn't even talk to our lawyer about that. Then we tried doggie pillows and whole bags of bones, but those inducements only made matters worse. Rosie and our other pets—Mittens the cat, Beauty the hermit crab and Gertrude Stein, our goldfish—became co-plaintiffs. Their lawsuit charged us with heinous acts, including attempted poisoning with tick powder, wrongful imprisonment and overfeeding. "Are we to be a nation of laws," the suit asked, "or a nation of men who think it's cute to make their pets do stupid tricks on the David Letterman show?"

At the trial last month, Rosie was the first witness. She looked so noble as she barked to tell the truth, the whole truth and nothing but. Then it was her lawyer's turn. "Rosie, where were you on the night of October 27, 1991, after your so-called 'owners' brought you home?"

"Arf!"

"In your doghouse, I thought so. And did the plaintiffs feed you those inhumane doggie crumbles?"

"Arf!"

"Objection!" our lawyer chimed in. "Counsel is leading the witness! Look at that soup bone in his hand!"

"Objection overruled!"

It was then that I noticed the jury. Seated in the box were three collies, two Siamese cats, two goldfish, a hermit crab and four gerbils. We didn't stand a chance. On our lawyer's advice, we plea-bargained. We agreed not to treat our pets like lowly animals, and our menagerie agreed to seek no monetary damages. My wife and I were sentenced to 100 hours of service at the local dog pound. If we humiliate Rosie or Mittens by petting them, if we don't feed Gertrude Stein the best goldfish flakes, if we don't get Beauty a new shell every year, we'll be behind bars before you can say "my dog has fleas."

So when Lucca left a little present for us on the kitchen floor the other day, I didn't brandish a rolled-up newspaper and shout, "Bad dog!" I just said, "I know, Lucca—you're innocent until proven guilty," and tossed her a tenderloin tip.

STEVE PICA

"A prediction: *The [Meade] ETX-Autostar concept will go down as the greatest happening in amateur astronomy yet.*" — *Sky & Telescope* magazine

Let Meade ultra-high-resolution optics take you on an automatic guided tour of the heavens. The rings of Saturn, the Orion Nebula, the Andromeda Galaxy, or any of 1200 other celestial wonders stored in the Autostar hand controller's database. Select an object, press GO TO, and watch as the ETX-60AT moves to the object, places it in the field of view, and tracks it across the sky — *automatically, first time, every time!*

Background photo by Jason Ware: the Andromeda Galaxy; Meade 6" Model 152ED telescope.

MEADE® ETX-60AT Astro Telescope

complete as shown with Autostar Hand Controller

— $299

Call **1-800-62-MEADE** for a free copy of Meade Telescope Catalog #134 or for a dealer location near you. Meade telescopes and accessories are available at over 3000 Meade dealer locations in the U.S.A. and Canada. Price listed is typical street-retail price in the U.S.A.

RITZ CAMERA 1 HOUR BIG PRINT
1-800-52-FOCUS
ritzcamera.com

natural wonders®
1-800-2-WONDER
naturalwonders.com

STORE OF KNOWLEDGE
1-800-SHOP-SOK
storeofknowledge.com

Discovery CHANNEL STORE
1-877-DCISTORE
discovery.com

THE NATURE COMPANY®
1-877-DCISTORE
discovery.com

amazon.com

MEADE INSTRUMENTS CORPORATION 6001 Oak Canyon, Irvine, CA 92618. (949) 451-1450. FAX: (949) 451-1460. www.meade.com

The largest-selling telescopes in the world • A NASDAQ Company

©2000

Saab vs.
Saab

The Saab Viggen supersonic fighter. The new Saab 9-3 Viggen Coupe. In both, human-centered design places controls and instruments where they are intuitively accessible. Reaction times are shortened. Whether engaging the turbocharger or the afterburner, car and driver, like pilot and plane, perform as one.

www.saabusa.com
1 800 SAAB USA

Saab automobiles and Saab aircraft are now manufactured by two separate, unrelated corporate entities. © 2000 SAAB CARS USA, INC.